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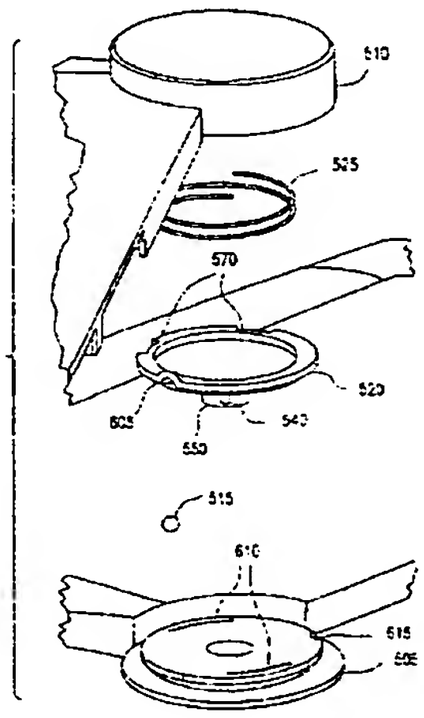
[54] 发明名称 可调整铰接定位的电子装置和方法

[57] 摘要

通过铰接定位器将一个产品的两个铰接部分(430，440)连接在一起。 当产品的二分之一部分从封闭位置或开启位置进入可调解的角度时，铰接定位器提供扣接信息反馈。 本发明的铰接定位器还允许容纳电线和连接器。 该铰接定位器的结构容易沿竖直轴线安装，并且，可以在工厂生产时，设定多个操作角度之一。 在可调整的铰接定位器中，可以转动刻度盘(520)或相同的机构，以便调整或设定需要的操作角度，以便使铰接产品的二分之一部分被打开。 迫使定位元件(540)与可调整的铰接装置中的可调整凹陷部分(610)所在位置脱离配合。然后，将定位元件(540)转动到铰接装置中的不同的调整凹陷部分(610)，最后，允许定位元件(540)在新的调整凹陷部分，再与可调整的铰接装置相配合。 这种机构允许选择多个可操纵角度。 在每一次要开启产品部分时，可以自动将其开启到预先选择的角度。 采用这种可调整的铰接定位器，可以连接 V 形键盘的二分之一部分，便携式电脑的屏幕与底座，折叠式双耳机的两个元件，或者可调整设备中的两个部分。



1、一种铰接的电子装置，其包括：

第一铰接部分（440）；

第二铰接部分（430）；

可操纵连接所述第一和第二铰接部分的定位器（405）；

其特征是：所述定位器（405）能够使第一铰接部分（440）相对于第二铰接部分（430）转动到多个预定位置；

其中定位器（405）包括定位调节器，所述定位调节器可以从多个预定位置转动地设定到单独的位置。

2、按照权利要求1所述的铰接的电子装置，其特征是：所述定位调节器包括位于所述定位调节器周缘的切口，所述定位调节器还包括角度地调节切口，和从定位元件改变的角度位置固定切口的装置，所述定位元件由至少一个定位槽和凹陷部分保持。

3、按照权利要求1所述的铰接的电子装置，其特征是：所述定位调节器还包括至少一个定位构件。

4、按照权利要求1所述的铰接的电子装置，其特征是：

所述第一铰接部分包括相联系的第一铰链区域；

所述第二铰接部分包括相联系的第二铰链区域；

所述定位器还包括对定位调节器产生偏置作用的弹簧和定位元件，其至少局部分地确定至少一个预定位置。

5、按照权利要求4所述的铰接的电子装置，其特征是：所述弹簧与定位调节器相结合。

6、按照权利要求4所述的铰接的电子装置，其特征是：所述第一铰链区域与所述第一铰接部分相联，所述第一铰链区域包括至少一个指示标记，所述指示标记位于离开所述第二铰链区域的侧表面上。

7、按照权利要求1所述的铰接的电子装置，其特征是：所述第一和第二铰接部分形成键盘的至少一部分。

8、一种铰接的电子装置，其包括：

第一铰接部分（130）；

第二铰接部分（140）；

可操纵连接所述的第一和第二铰接部分的定位器（105）；

其特征是：

所述第二铰接部分包括至少一个定位凸出物;

所述第一铰接部分包括多个成对的定位槽和定位凹陷部分;

定位元件定位于多个成对的定位槽和定位凹陷部分中的至少一个中;

由此，在安装过程中，通过将定位元件安置在多个成对的定位槽和定位凹陷部分中的至少一个中，选择定位位置。

9、按照权利要求8所述的铰接的电子装置，其特征是：所述定位器中还包括至少一个定位元件.

10、按照权利要求8所述的铰接的电子装置，其特征是所述定位器还包括:

多个定位元件，其中各定位元件分别位于多个成对的定位槽和定位凹陷部分中;

由此，在安装过程中，在将多个定位元件安置到多个成对的定位槽和定位凹陷部分中之后，可以选择多个定位位置中的一个.

11、按照权利要求8所述的铰接的电子装置，其特征是：所述第一和第二铰接部分形成键盘的至少一部分.

12、一种铰接的电子装置,

第一铰接部分（130、440）;

第二铰接部分（140、430）;

可操纵地使第一铰接部分连接到所述第二铰接部分的定位器（105、405）;

其特征是：所述定位器能够使第一铰接部分相对于第二铰接部分转动到多个预定的位置;

其中各第一和第二铰接部分形成键盘的至少一部分.

13、一种铰接的电子装置,

第一铰接部分（130、440）;

第二铰接部分（140、430）;

可操纵地使第一铰接部分连接到所述第二铰接部分的定位器（105、405）;

其特征是：所述定位器能够使第一铰接部分相对于第二铰接部分转动到由第一和第二铰接部分形成的平面中的至少一个预定位置;

其中各第一和第二铰接部分形成键盘的至少一部分。

14、一种用于操纵电子装置中的可调整铰链的方法，其中电子装置具

有第一铰接部分，第二铰接部分和定位器，所述的定位器在所述的第一和第二铰接部分之间形成可操纵地连接，并且包括定位调节器，所述方法包括:

使所述第一铰接部分相对于第二铰接部分转动到第一预定角度，此角度可以在所述第一铰接部分和第二铰接部分之间测量获得;

其特征是:

调整所述定位调节器，通过使定位调节器至少部分转动，使所述定位调节器可以从确定所述第一预定角度的第一位置调整到确定第二预定角度的第二位置，

使所述第一铰接部分相对于第二铰接部分转动到第二预定角度，所述第二预定角度可在所述第一铰接部分和第二铰接部分之间测量获得.

15、按照权利要求**14**所述的操纵可调整的铰链的方法，其特征是:还包括确定最佳角度的步骤，此角度可以在所述第一铰接部分和第二铰接部分之间测量获得。

16、按照权利要求**15**所述的操纵可调整的铰链的方法，其特征是:所述调整定位调节器的步骤还包括将定位调节器设定在优选位置，即所述优选角度的步骤。

17、按照权利要求**16**所述的操纵可调整的铰链的方法，其特征是:所述优选角度与第二预定角度相互一致，所述优选位置与第二位置相互一致。

18、按照权利要求**14**所述的操纵可调整的铰链的方法，其特征是:所述第一和第二铰接部分形成键盘的至少一部分，而且，所述转动步骤还包括，在键盘的至少一部分限定的平面中，转动上述键盘的至少一部分.

19、一种具有可调整的铰链的电子装置，其包括:

第一铰接部分（**440**）;

第二铰接部分（**430**）;

与所述第一和第二铰接部分的定位装置（**405**）可操纵相联系，以便在第一和第二铰接部分之间设定可操纵角度;

其特征是:所述定位装置包括至少一个基本上呈盘形的元件。

20、按照权利要求**19**所述的具有可调整的铰链的电子装置，其特征是:所述至少一个基本上呈盘形的元件包括定位调节器;

所述定位装置被设置在第一和第二铰接部分之间，还包括定位元件和弹簧，所述弹簧对所述定位调节器产生偏置作用。

21、按照权利要求20所述的具有可调整的铰链的电子装置，其特征是：所述定位调节器还包括至少一个固定在定位调节器上的定位构件；

可见的凸出物固定在所述定位调节器上。

22、按照权利要求21所述的具有可调整的铰链的电子装置，其特征是：第一铰链区域连接所述第一铰接部分，所述第一铰链区域包括至少一个指示标记；

第二铰链区域连接所述第二铰接部分，所述第二铰链区域包括至少一个扣接元件；

上述定位元件的至少一个凹陷部分位于任一所述第一铰链区域上，或者在第二铰链区域上，或者在所述定位调节器上。

23、按照权利要求20所述的具有可调整的铰链的电子装置，其特征是：所述第一和第二铰接部分形成键盘的至少一部分。

24、按照权利要求19所述的具有可调整的铰链的电子装置，其特征是：所述至少一个基本上呈盘形的元件包括定位板；所述定位装置还包括刻度盘，与所述定位板相互配合的键，所述键从所述刻度盘延伸，还有弹簧，所述弹簧对定位板产生偏置作用。

25、按照权利要求24所述的具有可调整的铰链的电子装置，其特征是：所述弹簧结合在定位板中。

26、按照权利要求24所述的具有可调整的铰链的电子装置，其特征是：所述刻度盘能够由手工调整。

27、按照权利要求19所述的具有可调整的铰链的电子装置，其特征是：所述至少一个基本上呈盘形的元件包括第一定位板；

所述定位装置还包括刻度盘，第二定位板，与所述第一定位板相配合的第一键，与所述第二定位板相配合第二键，对所述定位装置产生偏置作用的第一和第二弹簧。

28、按照权利要求19所述的具有可调整的铰链的电子装置，其特征是：所述定位装置还包括定位件，以便与至少一个基本上呈盘形的元件上的切口相扣接。

29、一种铰接的电子装置，其包括：

第一壳体（130）；

与所述第一壳体（130）可转动连接的第二壳体（140）；

其特征是在所述第一壳体（130）和第二壳体（140）之间设置定位器（105），所述提供定位的定位装置包括定位元件和多个成对的定位槽和由第一壳体形成的定位元件的配合件，其中多个成对的定位槽和定位元件的配合件中的每一对能够使定位元件相对于第一壳体保持在固定位置.

30、按照权利要求29所述的电子装置的铰链，其特征是：至少一个定位元件的配合件是定位球的凹陷部分.

31、按照权利要求29所述的电子装置的铰链，其特征是：所述提供定位的定位装置还包括多个所述定位元件；

其中在多个成对的定位槽和定位元件的配合件中容纳多个所述定位元件之一。

32、按照权利要求29所述的电子装置的铰链，其特征是：所述提供定位的定位装置还包括设置在第二壳体上的定位槽，以便允许所述定位元件在不受应力作用的情况下，相对于第二壳体移动.

33、按照权利要求29所述的电子装置的铰链，其特征是：所述提供定位的定位装置还包括定位凸出物；

在第二壳体上形成定位槽；

由此，当所述第一壳体相对于第二壳体转动，以便使电子装置开启，进入可操作位置时，所述定位元件以压靠方式通过所述的定位凸出物，进入所述定位槽中.

34、按照权利要求33所述的电子装置的铰链，其特征是：构成定位元件的材料不同于形成所述定位凸出物的材料.

35、按照权利要求29所述的电子装置的铰链，其特征是：还包括设置在所述第一壳体上的铰接.

36、按照权利要求35所述的电子装置的铰链，其特征是：还包括固定在所述铰链上的铰链固定件.

37、按照权利要求29所述的电子装置的铰链，其特征是：所述第一壳体或第二壳体或两者形成大的容纳空间的至少一部分，以便容纳电线，或通过铰接装置的元件.

38、按照权利要求29所述的电子装置的铰链，其特征是：所述铰链适合于沿竖直轴线组装.

39、一种铰接的电子装置，其具有定位机构，以便向使用者提供扣接

信息反馈，其特征是：

第一部分（210），所述第一部分限定第一近似圆形的路径，所述第一部分包括定位槽；

第二部分（205），所述第二部分限定第二近似圆形的路径，所述第二部分包括定位槽和定位凸出物；

定位元件（215）的形状与所述定位槽相配合；

其中所述第一和第二部分可转动地被连接，所述第一和第二近似圆形的路径形成相应的移动路线，所述移动路线适合于沿近似圆弧线通过定位凸出物引导所述定位元件，并且到达定位槽，而所述第一和第二部分相互生对转动。

40、按照权利要求39所述的铰接的电子装置，其特征是：所述第一部分还包括多个定位槽。

41、按照权利要求40所述的铰接的电子装置，其特征是：还包括多个定位元件，其中多个定位槽之一容纳多个定位元件之一。

42、按照权利要求40所述的铰接的电子装置，其特征是：（i）所述定位元件包括至少一个定位元件；（ii）在少于所有数量的多个定位槽中容纳至少一个定位元件。

43、按照权利要求39所述的铰接的电子装置，其特征是：所述第二部分还包括多个定位槽和多个定位凸出物。

44、一种铰接的电子装置，其具有可调整的定位机构，以便向使用者提供扣接信息反馈，其特征是：

第一部分（510），所述第一部分包括定位槽；

第二部分（505），所述第二部分包括至少一个第一配合的结构；

定位调节器（520），定位调节器的至少一部分设置在所述第一和第二部分之间，所述定位调节器包括至少一个切口，和至少一个第二配合结构，所述第二配合结构在操作过程中，对准至少一个第一配合结构；

定位元件（515）的形状与定位槽相配合；

其中所述第一和第二部分可转动地被连接，所述至少一个第一配合结构和至少一个第二配合结构可调整地接合，以便将所述定位调节器相对于所述第二部分，夹持在固定的角度位置。

45、按照权利要求44所述的电子装置，其特征是：所述至少一个第一配合结构包括至少一个调整凹陷部分，所述至少一个第二配合结构包括至

少一个定位销.

46、按照权利要求44所述的电子装置，其特征是：所述至少一个第一配合结构和所述至少一个第二配合结构包括产生摩擦的表面.

47、按照权利要求44所述的电子装置，其特征是：所述至少一个第一配合结构和所述至少一个第二配合结构包括凸起物.

48、按照权利要求44所述的电子装置，其特征是：还包括弹簧，以便使所述定位调节器朝向第二部分产生偏置，所述弹簧允许定位调节器受压离开第二部分，并且随着相对转动，相对于所述第二部分进入不同的角度位置.

可调整铰接定位的电子装置和方法

发明的技术领域

本发明涉及铰接定位装置，特别是涉及具有简单结构和可调整的操纵角度的铰接定位装置。

发明背景

很久以来采用键盘作为机械和电子设备输入装置。近年来，采用键盘主要作为电子设备的输入装置。例如，键盘式计算机和其它终端设备，例如,多用途电话中至关重要的部件。

不幸的是，键盘的原始结构与单一的矩形键盘相结合。这种键盘构造对于许多使用者感到不舒适。为了弥补这种缺陷，又设计出了许多现代化的键盘，其中将单一的键盘分成为两个小的键盘，这样的小键盘相互分开一定角度，通常称其为V形键盘。许多键盘使用者认为，这种结构更贴近人体工程学原理。在事实上，对于许多使用者来说，这种结构可以减少或消除使用键盘的不舒适感。

在现有技术中,通常使用两个技术特征之一形成键盘的V形角度。第一，两个二分之一部件可以分开，不使用连接的铰链，这种结构导致产生容易破坏和不可靠的V形角度。第二，借助铰链连接二分之一部分，采用螺钉将它们固定在一起。但是，采用这种技术结构，在使用中，导致铰链转动产生困难，浪费时间，而且，操作麻烦，尤其是对于便携式设备，感到使用不便。简而言之，在现有技术中，不存在结构简单，而且，能够有效保证具有V形角度的V形键盘。

观察一般的消费者使用的小型便携式电子产品，在许多设备中，铰链与定位机构相结合。例如，这种设备包括手持电话的折片门，便携式磁带播放机的门，以及回转天线。通常，这些现有技术中的定位铰链完全由塑料元件组成，一般这是不适用的。因为，在塑料部件之间，缺乏良好的耐磨损性能。此外，在现有技术中的定位器，通常安装困难。

许多这种产品将简单的定位机构与塑料材料制成的铰链结合在一起。例如，具有柱和孔的结构，其中圆形柱元件从铰链的一侧向另一侧伸出，并且具有孔或凹陷区域,以便圆形柱元件插入其中。当铰链转动时，在应力作用下，柱元件脱离原来的孔,并且产生滑动，进入新的孔中。然

后，圆形柱元件扣接在新的孔中。由此构成定位结构，并且使产品固定在可操作的定位角度。安装过程中，通常迫使两个二分之一组件组合在一起，直到两个元件对准扣接在一起。在现有技术中，其他复杂的结构包括在铰链机构中的凸轮表面和弹簧。

在现有技术中的定位器中存在的主要缺点是容易磨损。尤其是对于模铸到塑料铰链上的定位器，这是因为通常塑料元件之间缺乏耐磨性。所以，通常导致柱元件的一侧被破坏或磨损。尽管如此，还频繁采用这种结构，这是因为这种结构的成本低廉，而且，相当容易安装。同时应当知道，对于相互磨损的部件，采用不同的材料制造。最终趋于使柱元件被部分破坏，这是因为柱元件在相当长的时间期限内，频繁地受应力作用所致。

在现有技术中，在采用模制结构的技术方案中存在的缺陷是，定位位置不能改变，如果使用需要，很难取下定位机构。在更复杂的技术方案中，存在的主要缺陷是由于采用片状弹簧和凸轮部分，上述结构更加复杂。一般复杂的结构导致产生高成本，增加安装时间，具有大量零部件，需要更高的可靠性。此外,这些结构在铰链中占据了相当大的空间。对于如今消费者使用的电子产品，其中包括电线、线路、连接器等等，这些装置需要穿过铰链装置。而且，由于在生产中存在着实际成本的竞争，不希望采用上述结构。在事实上，当在V形键盘中使用铰链时，因为左右二分之一键盘之间必须具有电连接，并且，连接线必须通过铰链装置。

另一种设置在便携式电子设备中的铰链运动装置是诺基亚移动电话有限公司（NOKIA MOBILE PHONES LYD.）的、在1997年5月7日公开的欧洲专利EP－772333 A2。这种铰链能够使便携式电话机的盖子相对于电话机主体转动。这个专利公开了一对花生形状的铰链，在一对弯曲的弹簧元件作用下，铰链被偏置进入开启或封闭位置。但是，这种诺基亚的便携式电话既不能提供一个以上的开启位置，也不允许对单一的开启角度进行调整。此外，这种诺基亚电话中的花状形状的铰链和弯曲的弹簧元件，最终存在着使弯曲的弹簧元件被破坏的问题。在非电子设备的应用情况下，在1994年5月26日公开的、授予LOGGEN的德国专利DE－4239358 A1中公开了一种铰链，其中包括受弹簧偏置作用的球轴承。但是，在LOGGEN的专利中，没有可以改变的铰链转动位置、轨迹或可调节性能。

相对于V形键盘，在现有技术中存在的其他缺陷是，在两个部件之间通常包括固定角度。但是，单一的设定角度并非对于所有的键盘使用者是

最佳状态. 因此, 对于许多这种V形键盘, 允许调整角度, 这是非常重要的, 因为V形角度是确定键盘舒适感和可使用性的重要因素. 在可调整的V形键盘具有非常重要的优点的同时, 不幸的是, 在事实上, 寻找合适的V形角度的过程是不明智和浪费时间的. 对于初始的V形角度必须选择, 键盘必须固定在此角度.

在事实上, 寻找合适的V形角度的过程是不明智和浪费时间的。对于初始的V形角度必须选择, 键盘必须固定在此角度。在现有技术中, 通常采用螺帽或螺钉固定选择的V形角度。然后, 必须使用键盘一段时间。一旦键盘使用者决定改变键盘的角度方向, 将重复上述过程。而且, 当不能确定改变方向时, 而这个方向又必须选择的情况下, 在此过程中, 需

要增加其他步骤。最终，在多次测试V形角度之后，选择合适的V形角度定位。

在这些现有技术中，可调节的键盘中存在的其他问题是，每一次改变键盘的V形角度时，这一过程需要花费很长时间。这种情况将频繁产生，例如，在常规情况下，由两个使用者共同使用一个键盘时。此外，如果这种键盘被用于便携式设备，其键盘被设计为能够折叠，以便能够在紧凑的空间内贮存和输送，因此改变键盘的V形角度的情况将更加频繁产生。

因此，本发明的一个目的是，提供一种结构简单，而且，使用方便的铰接定位器，其能够连接V形键盘的两个二分之一部分，并且保持键盘处于V形角度。

本发明的另一个目的是，提供一种低成本的铰接定位器，其便于安装。

本发明的另一个目的是，提供一种具有较大空间的铰接定位器，以便使电线、连接器等装置通过铰链。

本发明还有另一个目的是，提供一种铰接定位器，其很容易改变或离开制造时的位置，在这种产品的使用周期，或制造产品时，需要改变产品的定位，或者使产品的角度变化，进入特殊的定位位置。

本发明的另一个目的是，提供一种调整V形键盘的方法，一旦设定到合适的V形角度，使键盘自动开启到合适的V形角度。

本发明的另一个目的是，提供一种用于V形键盘的方法，使键盘对于优选的V形角度具有“记忆能力”。

本发明还有另一个目的是,提供一种能够容易设定最佳角度的方法。

本发明还有另一个目的是，提供一种不使用工具，就能够容易设定最佳角度的方法。

本发明还有另一个目的是，提供一种方法，其能够使键盘使用者在优选的V形角度迅速再定位，即使当另一个键盘使用者改变了已经具有的V形角度，而不需要花费很长时间。

本发明还有另一个目的是，提供一种采用刻度盘、或可以看到的凸出物，来设定V形角度的方法，以便使V形键盘进入需要的操作角度。

本发明的一般目的是，提供一种可以用于多种产品的可调整的铰接定位器。

通过实现上面所述本发明的目的，可以消除现有技术中存在的上述缺陷，下面将对本发明进行描述和解释.

发明概述

采用铰接定位器连接产品中的两个可转动部分，可以达到本发明的上述目的和其他目的. 结构简单的铰接定位器包括定位元件和凹陷部分，例如，V形口或凹槽，当产品的二分之一部分从封闭位置或开启位置移动到可操作角度时，由铰接定位器提供扣接信息反馈. 此外，铰接定位器可以有多个由制造商设定的可操作的角度. 这种定位器容易沿着Z轴线组装. 而且，在组装期间，定位器为容纳电线、连接器等装置提供了空间. 此外，由于制造定位元件的材料与定位装置的其它部分不同，使发明的铰接定位器具有比较长的使用寿命.

在可调整的铰接定位器实施例中，可以通过转动刻度盘或类似的机构，来调整或设定需要的可操作角度，以便使铰接产品的二分之一部分进入开启位置. 迫使定位元件与可调整的铰链中的一个设定的调整凹陷部分脱离配合，然后，转动到铰链中的不同的调整凹陷部分，最终，在新的调整凹陷部分，使定位元件在可调整的铰链中产生配合. 这种机构允许选择多个可操作的角度. 每一次使产品的各部分再开启，可以使其自动进入预定的选择角度.

根据优选的实施例，对于V形键盘,应当注意到，在优选的V形角度，使用V形键盘时，对于具有键盘的便携式设备，必须折叠，以便输送，这就存在许多麻烦之处. 对于便携式设备的每一次移动，都必需再次经过设置V形角度的过程. 因此，实际上，应当保证这种便携式设备以快捷迅速的方式完成角度调整. 由于能够使V形键盘自动再开启到预先设定的V形角度，本发明的可调整的铰接定位器很容易用于折叠式、或便携式设备的V形键盘中.

在一个可调整的铰接定位器实施例中，定位元件被夹持在两个产品部件中的第一部分的定位槽中，所述产品部件可以是通过本发明提供的可调整的铰接定位器连接的V形键盘的二分之一部分. 在第二产品部分中，由凹陷部分夹持定位元件，使其定位. 当铰接部分相互之间相对转动时，迫使定位元件离开凹陷部分，并且，由定位槽带动定位元件，沿着路径移动到V形口，此V形口所在位置是调整和确定设备开启角度的位置. 定位器的扣接结构使定位元件进入V形口，并且，完成开启键盘的操

作过程。使铰接定位器进入封闭位置的程序与进入开启位置时的相反。

在本发明提供的铰接定位器，有两个可调解和不可调整铰接定位器的实施例，其不仅可以用于键盘，还可以采用这种铰接定位器，有效地控制便携式电脑屏幕开启的角度、折叠式双耳机展开的角度，以及设备中两个部分之间的倾斜角度，例如手持电话。此外，本发明提供的铰接定位器还可以用于固定部件之间的角度，例如手持电话的折片门、便携式磁带播放机的门，以及旋转式天线。

对附图的简要描述

通过下面参照附图的详细描述，可以更加全面的理解本发明的方法和装置。

图1A是仰视图，其表示本发明的不可调整的实施例，其中装置处于关闭位置。

图1B是俯视的立体图，其表示本发明的不可调整的实施例，其中装置处于开启位置。

图2A是分解的立体图，从第一不可调整的实施例之上观看。

图2B是从下方所示分解的立体图，从第一不可调整的实施例之下观看。

图3A是从第二不可调整的实施例的右壳体之下看的仰视图。

图3B是第二不可调整的实施例的左壳体的俯视图。

图4A是俯视的立体图，其表示本发明的第一可调整的实施例，其中装置处于开启位置。

图4B是俯视的立体图，其表示本发明的第一可调整的实施例，其中装置处于封闭位置。

图5A和5B是分解的立体图，其表示第一可调整的实施例。

图6A和6B也是分解的立体图，其表示第一可调整的实施例。

图7、7A和7B分别表示处于封闭位置的第一可调整的实施例。

图8、8A和8B分别表示处于开启位置的第一可调整的实施例。

图9、9A和9B分别表示处于开启位置的第一可调整的实施例。

图10、10A和10B分别表示第一可调整的实施例。

图11、11A和12分别表示第一可调整的实施例，其中装置设定为具有V形角度。

图13和14是分解的立体图，其表示本发明的第二可调整的实施例。

图15和16是分解的立体图，其表示本发明的第三可调整的实施例.

图17是分解的立体图，其表示本发明的第四可调整的实施例.

图18是分解的立体图，其表示本发明的第五可调整的实施例.

对实施例的详细描述

通过参照附图1A～18，可以非常清楚的理解本发明的优选实施例及其优点，在多个附图中，采用相同的代号表示相同或相似的零部件.

参照附图1A～3B，其表示用于两个可转动部件之间的不可调整的铰接定位器的实施例。这些不可调整的铰接定位器结构的附图描绘了不可调整的铰接定位器的详细结构. 此外，为便于理解下面所述的可调整的铰接定位器的结构奠定了基础.

参照图1A，其中表示处于关闭位置的不可调整的铰接定位器装置的仰视图。所谓不可调整，意味着在正常的操作过程中，不能调整操作角度。在后续部分的描述当中，不可被调整的铰接定位器的实施例允许在安装过程，或者在后来的定位器折卸过程中，可以选择具有可调整的角度，或者具有定位位置，这在后面所述的实施例中也是允许的。在另一个实施例中，具有多个定位位置，即，具有两个或多个可调整的角度，以便转动，然后，夹紧定位。在后面所述的其他实施例中，不可调整的铰接定位器实施例包括可调整的刻度盘或定位调节器。不可调整的铰连105连接右手键盘140和左手键盘130.

应当注意到，在键盘采用不可调整的铰接定位器仅仅是个例子. 例如，不可调整的铰接定位器可以用于控制便携式电脑屏幕开启的角度，可折叠的双耳机展开的角度，或者直立部件与倾斜部件之间的角度，例如，手持电话。此外，这种不可调整的铰接定位器可以用来提供定位角度，例如，用于手持电话的折片门，便携式磁带播放机的门，以及转动天线。

参照图1B，从上方观察处于开启位置的键盘. 被封盖的铰连105连接左手键盘130与右手键盘140，被封盖的铰连105保持上述键盘处于附图中所示的开启定位位置。在附图1B所示的键盘中，没有描绘出按键。

应当看到，可以采用其它定位装置代替定位球，这是非常重要的。例如，可以采用定位柱. 此外，在可调整的定位器结构的实施例中，可以采用其他除上述定位装置以外的定位元件，例如，受弹簧作用的定位球和定位柱. 常用的附加定位元件包括柱和孔定位器，定位爪，定位夹

紧器，凸轮表面和弹簧。应当知道，定位球和定位柱是常用的装置。但是，受弹簧作用的定位球和定位柱是不常用的。

下面参照图2A和2B，其中表示了不可调整的铰接定位器的第一实施例。最好,左手键盘130连接左壳体210。左壳体210支撑铰接轴220，并且设有球形凹陷部分240。在优选的实施例中，采用了这种球形的凹陷部分240。也可以采用圆柱形凹陷部分,因此，圆柱形凹陷部分是另一种例子。此外，可以采用一般的配合结构。一般的配合结构包括凹陷部分和凸出物。通常，这种结构包括各种表面纹理，凸出表面或凹陷表面，其有助于定位槽230容纳定位装置。例如，具有凹陷底部的圆柱形定位装置可以形状凸出的定位装置相互配合。定位槽230也可以设置在左壳体210中。在安装之后，定位球215被容纳在定位槽230内。最好右手键盘140连接右壳体205。右壳体205包括球槽235和定位凸出物245，上述球槽是通常采用的定位装置。定位槽250设置在右壳体205上。此外，大的储存空间260被设置在右壳体205中，以便于铰接轴220相互连接。大的储存空间260在铰接轴220和铰链壁之间提供有效的空间，以便容纳电线、电缆、连接器等物。这种空间贮存能力对于今天的许多新产品是非常需要的，而且，在V形键盘中，在左右二分之一键盘中必须建立电连接。

如图所示，通过竖直安装轴线225，可以沿着Z轴线安装铰链。这种采用竖直轴线安装的方式，适合于大批量和自动化生产。通过将定位球215放入球形凹陷部分240中，将右壳体205安装在左壳体210上，夹住定位球215。然后，在铰接轴220上压紧安装铰接固定件255，完成安装。由铰接固定件255将定位装置安装在一起。应当知道，也可以采用其他将两个壳体固定在一起的装置。例如，其包括在铰接轴220上采用扣接件，在这种情况下，不需要使用铰接固定件255。如果不使用铰接固定件255，右壳体205可以包括固定的覆盖表面，以便在大的储存空间260中容纳电线。

下面继续参照图2A和2B，描述铰链的操作过程。定位球215总是保持在定位槽230中。因此，定位球215随着左壳体210移动。在一个实施例中，当右手键盘140和右壳体205围绕铰接轴220的轴线转动时，定位球215从球槽235的起始端到终端自由移动，即不受应力作用。如果，定位球215要离开球槽235的通道，定位球215必须挤压通过定位凸出物245。所述定位凸出物245由弹性塑料材料制成。然后,定位球215被扣入定位槽250中。在此位置，定位装置再次不受应力作用，然后，保持壳体处于开启位置。

再实施相反方向的运动，使二分之一键盘和壳体返回封闭位置．在球槽235的起始位置，可以设置另一成对定位凸出物和定位槽，以便在封闭位置形成有效定位．

最好，定位凸出物的区域设有塑料弹性元件，其具有足够的刚性，以便获得需要的定位固定信息反馈．在上面所述的优选实施例中，定位装置，定位球最好是与铰链的其它部分不相同的材料，例如，不相同的塑料材料．对于合适的结构，塑料弹性元件与不同材料的定位装置相结合，能够大大减少在定位凸出物上产生的磨损．因此，这种定位装置具有比较长的使用寿命．此外，在此系统结构中，球槽235只在定位球215通过定位凸出物245的位置承受应力和摩擦力作用。与现有技术中的结构相比较，这种结构进一步减少了磨损。

下面继续描述铰链的操作过程，当定位球215卡入定位槽250内时，V形键盘处于开启位置。这个位置相应于不可调整的铰接定位器中的、单一的、不可调整的操作角度。应当知道，在不可调整的铰接定位器中，可以设置多个不可调整的操作角度。例如，沿着可能加长的球槽235，设置多个定位凸出物/定位槽/定位凸出物的三元件组。键盘使用者通过使左壳体210相对于右壳体205转动，通过几次定位装置的卡入配合，使定位装置进入需要的操作角度。

下面参照图3A和3B,其中表示第二不可调整的铰接定位器的实施例。在图3A和3B所示的实施例中，采用了多个可操作的角度．在图3A中表示了右壳体的仰视图，在图3B中表示了左壳体的俯视图．在图3A中，表示原始的球槽335，定位凸出物345和定位槽350的位置．在原始的定位槽350的原始的定位凸出物345的相对侧，设有附加的定位凸出物375。超过附加的定位凸出物375的区域是附加的球槽365。在图3B中描绘了原始的定位槽330，附加的定位槽360和使用的定位元件395的位置。如图所示，原始地定位槽330相对于可以使用的第四定位位置和第四定位元件，在此实施例中，定位元件最好是定位球。

如图3B所示，多个定位装置，例如定位球或定位柱，可以被放入原始的定位槽330和附加的定位槽360中．如果只插入一个定位元件，那么只使用一个定位位置，或者一个可操作的角度。但是，在安装过程中，利用多个定位槽，制造者可以选择需要的定位位置．此外，通过拆卸铰接定位装置，并且将定位装置放置在不同的定位槽中，可以改变定位位

置. 通过上下文可以得知, 图3B中所示的左壳体可以用于图2A和2B所示的右壳体.

另外, 图3B所示的左壳体可以与图3A所示的右壳体成对使用. 当与图3A所示的右壳体成对使用时, 定位元件可以插入多个, 实际上是所有定位槽中, 以便定位元件能够在多个定位位置中被夹紧. 当铰链被夹紧在第一可使用定位位置之后, 第一定位球可以挤过附加的定位凸出物375, 并且, 进入附加的球槽365中. 第一定位球沿着附加的球槽365在第一定位槽中移动, 直到第二定位球挤过原始的定位凸出物345, 并且进入原始的定位槽350. 这个过程可以连续通过第四个可以使用的定位位置, 其相应于原始的定位槽330.

这种不可调整的铰接定位结构比现有技术中的定位结构具有更多的附加优点. 如果在铰接定位装置不再需要原有位置, 完全可以再移动定位元件. 还有, 如果希望使用比较小的定位作用力, 可以使用比较小的定位元件, 或者说, 如果希望使用比较大的定位作用力, 可以使用比较大的定位元件.

应当知道, 本专业的普通技术人员通过阅读, 可以理解下面所述的可调整的铰接定位器的实施例, 其中将其他详细的具体构造与不可调整的铰接定位器相结合, 并且还给出了可能修改的方案. 而且, 相反, 通过理解不可调整的铰接定位器的结构, 有助于理解可调整的铰接定位器的结构的多个方面和可能改进的形式.

下面参照图4A, 其中描绘了作为第一可调整的铰接定位器的实施例, 这是具有V形角度的键盘. 在附图中描绘键盘的同时, 应当理解, 这仅仅是一个说明性的例子, 可以使用的范围不仅限于此. 按照本发明的方面, 这种可调整的铰接定位装置同样可以用于许多其他设备中. 例如, 其可以用于控制便携式电脑屏幕的开启角度, 可折叠的双耳机展开的角度, 或者设备中部件之间的倾斜角度, 例如手持电话. 此外, 其还可以用于提供定位角度, 例如, 用于手持电话的折片门, 便携式磁带播放机的门, 以及旋转天线. 再参照图4A, 其中表示键盘400处于安装好的开启位置. 下面参照图4B, 其中表示键盘400处于安装好的封闭位置. 在附图4A和4B中, 由可调整的铰链405连接左键盘430和右键盘440.

下面参照附图5A和5B, 图中描绘了第一可调整的铰接定位器实施例的上铰链区域505和下铰链区域510. 在图5A中还表示, 上铰链区域505连

接右键盘440，下铰链区域510连接左键盘430．还有，如图1～3中所示的不可调整的铰链，在图5A和5B中所示的可调整的铰链包括定位球515，如图5B中所示。应当知道，如同本发明的所有其他实施例，可以采用其他定位元件代替定位球，这是非常重要的。例如，可以采用定位柱．此外，除上述定位元件以外，还可以采用其他定位元件，例如，由弹簧作用的定位球或定位柱，上述元件可以用于可调整的铰接定位器的实施例．普通的附加定位元件包括定位柱和定位孔，定位爪，定位夹紧装置，凸轮表面和弹簧。应当注意到，定位球和定位柱是通常使用的．但是，受弹簧作用定位球和定位柱不常用。

下面参照图5B，本发明的指示标记由代号560所示。由指示标记560表示出可以使用的操作角度的范围，由此可以设定可调整的铰接定位器所处的角度。在优选的可调整的铰接定位器的实施例中，指示标记560可以是，（i）排列的射线；（ii）表示可操作角度变化弧度的数字；（iii）两者的结合。在操作中，通过箭头指示器555指向相应的指示标记560，V形键盘可以设定在需要的V形角度。在此第一可调整铰接定位器的实施例中，最好通过插入工具，例如螺旋驱动器，进入凹槽545，即可调整铰链的定位角度。所述凹槽545被设置在可以看到的凸出物550上，插入工具可以施加向下的作用力．施加的向下作用力压迫偏置弹簧525，允许定位调节器520下降，到达下铰链区域510底部。如下面所述，一旦定位调节器520下降，其可以转动进入新的位置，即，箭头指示器555可以转动指向指示标记560中的新位置。还应当知道，在附图中所示的定位调节器基本上呈圆形元件，在不脱离本发明的范围和构思的条件下，本专业的普通技术人员还可以采用其他形状的元件。

如下文中提到的附图所示，以及在上下文中提到的刻度盘，在附图中所示的，可以看到的凸出物550可以稍微予以修改，以便其可以由使用者的手转动。这种修改方式属于本专业普通技术人员已知的。因此，可以看到的凸出物550可以包括刻度盘，反之亦然。

定位调节器520还包括可以看到的凸出物550，升高部分535，还有一个或多个定位销540。在定位调节器520中设有一个或多个扣接元件的空隙570，以便为一个或多个扣接元件565提供通道，所述扣接体元件565设置在下铰链区域510上．最后，下铰链区域510还包括定位槽530，所述定位槽530呈凹陷部分．

下面参照图6A和6B，图中从相反的位置，以立体图描绘了左键盘430、右键盘440、下铰链区域510和上铰链区域505．还可以看到，在下铰链区域510和定位调节器520之间设有偏置弹簧525．同样，图中还描绘了扣接元件的空隙570，可以看到的凸出物550和定位球515．

图6B还描绘了设置在定位调节器520中的凹槽605，以及设置在上铰链区域505中的凹陷部分615．设置在上铰链区域505中的调整凹陷部分610具有与定位销540相互配合的结构。从附图中可以看到，一旦向下压定位调节器520，达到足够的距离，向下压意味着调节器靠近下铰接部分510．然后，定位销540下降，其低于调整凹陷部分的610．一旦定位销540脱离调整凹陷部分610的约束，可以由可看到的凸出物550转动定位调节器520．一旦箭头指示器555转动到指示标记560中的需要位置，可以得知，需要位置相应于最舒适的V形角度，或者说需要的角度是下一个需要确定的最舒适的V形角度．然后，释放作用在定位调节器520上的压力，在偏置弹簧525的作用下，使定位调节器520朝着上铰链区域505上升。

基本上在同时，定位销540上升并且进入调整凹陷部分610中的位置，此时定位销540占据的位置与定位调节器520转动之前的位置不相同．一旦以这种方式设定可调整的铰链，可以使V形键盘处于封闭位置．如果要使键盘处于开启位置，可以通过确定凹陷部分610和定位销540之间的位置，并且，由箭头指示器555指示出相关的指示标记560中的位置，可以使键盘自动进入最新设定的V形角度．由此，设定过程或再设定过程完成。

新设定的V形角度是新的操作角度。因此，操作角度的变化取决于可调整铰接定位器的设定，正如确定相关的箭头指示器相对于指示标记的位置。此外，如果需要，使用者可以使用多个操作角度。例如，如果可调整的铰接定位器与一个使用设备相结合，其频繁地用于两个不同的设定位置，或可操纵的角度，因此，可以对优选的可调节的铰接定位器的实施例进行改进，最好，对于多个箭头指示器555，在定位调节器520中设置多个凹槽605．

概括来讲，可调整的铰接定位器的一个目的是，向使用者提供设定优选的键盘开启的角度的能力，随后，V形键盘具有“记忆能力”处于优选的V形角度，直到使用者决定改变该角度。至此,已经说明了作为优选的可调整铰接定位器的第一实施例,在附图7－12表示了其他实施例。

下面参照图7、7A和7B，在图中表示了位于封闭位置的键盘的局部横截面．在此位置，由定位调节器520和偏置弹簧525使定位球515偏置，并且，进入右键盘440中的上铰链区域505中的凹陷部分615．此外，定位球515被保持在左键盘430中的下铰链区域510中的定位槽530内。应当看到，定位调节器520具有上升部分535，其进一步使定位球515位于定位槽530中。

当围绕铰链中心分开或使键盘处于开启位置时，迫使定位球515向下移动，克服偏置弹簧525的作用力，使右手键盘440中的上铰链区域505中的凹陷部分615转动的离开此位置。

下面参照图8、8A和8B，在图中表示了处于开启位置的键盘的横截面视图．在此位置，二分之一键盘处于完全封闭位置和需要的开启位置，例如优选的V角部位置之间的某一个位置。接着，通过左手键盘430中的下铰链区域510的定位槽530，使定位球515保持在相对于左手键盘430中的角度位置，和定位球515保持在定位调节器520的升高部分535中的角度位置相同．

下面参照图9、9A和9B，在图中表示了处于希望开启位置的键盘的横截面视图。当中二分之一键盘到达希望的开启位置时，在定位调节器520中的凹槽605对准定位球515所在位置，即对准右手键盘440中的定位槽530．如图9A中所示，偏置弹簧525迫使定位调节器520将定位球515夹持在定位调节器520的凹槽605中，让使用者具有键盘定位的感觉，指示二分之一键盘进入需要的V形角度位置．

当要使二分之一键盘返回其封闭位置时，铰链具有相同功能。但是，操作过程相反。

如上所述，在左手键盘430的下铰链区域510中的定位槽530保持定位球515相对于左手键盘430的角度位置。下面讨论定位调节器520相对于右手键盘440中保持位置的特征。

在附图10、10A和10B中，描绘了定位调节器520如何保持在右手键盘440中．最好，两个定位销540构成定位调节器520的部分，所述定位销540向外延伸，进入右手键盘440的上铰链区域505中的调整凹陷部分610，它们相互配合。不论右手键盘440如何移动，这些定位销540保持定位调节器520处于右手键盘440中的需要的角度位置。

定位销540的长度足以保持定位销与定位调节器之间相互作用，这是非常重要的，直到由于定位球515下降，迫使定位调节器520下降，即离开

右手键盘440的上铰链区域505时为止，以便二分之一键盘从完全封闭位置移动到需要的开启位置，反之亦然。应当知道，定位销540不是本发明的权利要求书所述范围中限定的唯一装置．例如，可以采用肋条、凸起物、或者其他类型的装置来代替定位销，只要保证定位调节器520相对于右手键盘440中的位置。另一种可能采用的方式是摩擦装置。例如通过采用偏置弹簧525，产生强有力的接触，能够增加有效摩擦，或者通过使用不同的材料，例如橡胶，以便获得比较大的摩擦效果，或者采用两者相结合的结构。通过阅读和理解本发明的原理之后，本专业的普通技术人员可以得知，可能采用的其他摩擦装置包括采用高摩擦材料的结构。

参照图11、11A和12，这些图表示使用者将定位器设定到需要的开启位置的调整过程。以及再调整到封闭位置，使用者将螺旋驱动器或其他这类装置插入物凹槽545，或者设置在定位调节器520的可看到的凸出物558上的等效装置中．沿着向下的方向在可看到的凸出物550上施加压力，迫使定位调节器520向下移动，由定位调节器520压缩偏置弹簧525．使弹簧偏置，以及使得在定位调节器520的底部与左手键盘430的下铰链区域510之间具有足够的距离，以便允许定位调节器520向下移动，足以使定位调节器520的定位销540与右手键盘440的上铰链区域505中的调整凹陷部分610完全脱离，这是非常重要的．

然后，转动定位调节器520，例如借助螺旋驱动器或其他装置，直到定位调节器520进入需要的角度位置。设置在定位调节器520的可看到的凸出物550上的箭头指示器555对准使用者可以看到的，设置在右手键盘上的指示标记560，设置定位器进入需要的开口位置．当取消作用在可看到的凸出物550上的压力时，偏置弹簧526产生反作用，迫使定位调节器520向上移动，夹紧定位球515。再使定位销540相对于右手键盘，保持在新的定位器开启位置。

下面参照图13，其中描绘了本发明第二可调整的铰接定位器的实施例。此第二可调整的铰接定位器的实施例包括对第一可调整的铰接定位器的实施例修改的方式．在附图中指示凹陷部分615位于其所在的上铰链区域505的下侧。但是，在附图13中，看不到凹陷部分615．最好，定位肋条1310基本上垂直于定位调节器520的平面．构成的定位肋条1310作为第一可调整的铰接定位器的实施例中的定位销540。相应的，采用带有凹

槽的调整凹陷部分1320代替第一可调整的铰接定位器实施例中的调整凹陷部分610，以便适合于容纳定位肋条1310.

应当注意到附图中使用的代号. 首先，肋条的高度最好大于定位球515的直径，以便保证定位调节器520随着右手键盘440转动。其次，肋条的数量与可能选择的定位角度成正比，以及肋条的方位指向可能选择的、定位角度的方向. 第三，除定位销、肋条和凸出物以外，还可以有许多其他定位元件，其可以用于本发明的可调整的铰接定位器中。最后，应当注意到，最好，偏置弹簧525允许定位调节器520下降，其下降的距离大于肋条的高度，以便允许调整定位器的角度.

下面参照图14，其中表示了对于第一和第二可调整的铰接定位器实施例的修改方式。代替分开的元件，可以将前面所述偏置的弹簧525与定位调节器520相结合，或者结合其他的元件，例如，与上铰链区域505或者下铰链区域510相结合. 如附图中所示，偏置弹簧1410与经过修改的定位调节器1420相结合。通过附图可以看出弹簧元件包括偏置弹簧1410，还可以采用其他结构的弹簧.

下面参照附图15，其中描绘了第三可调整的铰接定位器实施例。采用刻度盘1510和定位板1520代替定位调节器520. 所述各元件被放置在上铰链区域505和偏置弹簧525之间，并且由扣接元件565保持定位，通过扣接元件565将左手键盘430和右手键盘440固定在一起. 刻度盘1510包括向下延伸的刻度盘键轴1530，所述键轴1530与定位板1520中的键轴配合孔1540相互配合。转动刻度盘1510，然后，转动定位板1520和定位板的球的凹陷部分1550. 在第三可调整的铰接定位器实施例中，还描绘了其他定位元件. 在此可调整的铰接定位器实施例中，包括位于刻度盘1510上的第一粗糙表面1560，以及位于上铰链区域505的下侧的第二粗糙表面1570。第二粗糙表面1570适合与第一粗糙表面1560相互配合. 在第三可调整的铰接定位器实施例中，定位球515沿着圆形路径移动，直到定位球515到达定位板的球凹陷部分1550，当定位球被凹陷部分夹紧时，其形成定位结构。通过刻度盘键轴1530和键轴配合孔1540转动刻度盘1510，从而转动定位板的球凹陷部分1550。这种相互作用允许定位角度，在优选的键盘和调整铰接定位器实施例中，设置V形角度，并且，可以具有比较大的变化角度。应当知道，刻度盘1510的直径最好小于定位球移动区域的直径，以便定位球能够与设置在上铰链区域505的下侧的凹陷部分615

相互配合。

下面参照图16，其中描绘偏置弹簧525怎样与定位板1520相互结合。从图中还可以看到与定位板1520相结合的偏置弹簧1610的指状弹簧片，对此，也可以采用其他弹簧结构来代替。

下面参照图17，其中描绘了第四可调整的铰接定位器的实施例。这个可调解的铰接定位器实施例最好安装有连接的螺钉1710，所述螺钉1710定位于下铰链区域510。可以采用其他安装连接装置，例如，可以采用销轴连接，铆接等等。在安装螺钉1705的下方设有可以由手工转动的刻度盘1720，所述刻度盘1720穿过上铰链区域505。采用手工转动的刻度盘1720，控制定位角度，即控制V形键盘的V形角度。

手工转动的刻度盘1720还包括V形切口指示器1715，所述类型接口指示器1715被设置在刻度盘1720的上表面，上铰链区域505还包括角度指示标记1730。如同前面附图中所示，在上下文中所述的可以看到的凸出物，可以对图17中所示的手工转动刻度盘1720进行稍微修改，以便可以采用工具，例如螺旋驱动器来操作。这种修改方式属于本专业的普通技术人员公知的常识。因此，所述刻度盘可以包括可以看到的凸出物，反之亦然。

在上述区域505和下铰链区域510之间设有第一偏置弹簧1740，第一定位板1750，第二定位板1765和第二偏置弹簧1780。手工转动的刻度盘中的键轴1725与设置在第二定位板中的键轴配合孔1770相互配合。上铰链区域中的键轴1735与设置在第一定位板1750中的第一键轴配合孔1760相互配合。

第四可调整的铰接定位器实施例中还包括下列元件：第一，座落于定位球夹持凹陷部分1785中的定位球1755，所述凹陷部分1785位于下铰链区域510中。第二，第一定位板1750包括第一定位板的定位球凹陷部分1745，第二定位板1765包括第二定位板的定位球凹陷部分1775。

可以看到，当不要求转动时，手工转动的刻度盘1720和手工转动刻度盘的键轴1725，在安装位置，与第二定位板1765形成摩擦定位结构。另外，V形切口、齿形物等元件可以用于作为保持左手键盘430和右手键盘440相对定位的零部件。

下面继续解释定位器的操作过程，最好，使定位球1755保持在定位球夹紧的凹陷部分1785中，而且，使定位球1755定位于上述定位槽中，

此时，定位器不能产生转动。在定位器的封闭位置，定位球1755的位置由扣接元件通过第一定位板的定位球凹陷部分1745保持定位。当要打开铰接部分，即，左手键盘430和右手键盘440时，随着第一偏置弹簧1740被压缩，定位球1755脱离第一定位板的定位球凹陷部分1745的约束，在定位球夹紧凹陷部分1785的推动下，定位球1755沿着圆形路径移动。方定位球1755到达第二定位板的定位球凹陷部分1775时，第二偏置弹簧1780伸展或收缩，将定位球1775夹紧在第二定位板的定位球凹陷部分1775中。

因此，通过转动手工转动刻度盘1720，由此驱动联接的第二定位板1765可以改变键盘的操作角度．应当注意到，在一个或多个定位板中结合设置第一和第二偏置弹簧1740和1780，属于本发明的第四可调整的铰接定位器实施例所述的范围．

参照图18，其中描绘了第五可调整的铰接定位器实施例。在设计结构和操作方面，第五可调整的铰接定位器实施例于第四可调整的铰接定位器实施例相类似．其中取消了上铰链区域的键轴1735，和第一定位板1750．在上述区域505中设置凹陷部分1820，以便在封闭位置，容纳定位球1755。在没有设置上铰链区域的键轴1735的情况下，非键轴元件1810作为加强结构．

手工转动的刻度盘键轴1725与设置在定位板1830中的键轴配合孔1840相互配合．而且，偏置弹簧1860向定位板1830施加向上的作用力。当定位球1755到达定位板的定位球凹陷部分1850时，使用者可以感受到定位器扣接，从而得知两个键盘部分430和440到达设定的定位角度。可以看到，偏置弹簧1860可以被结合在铰接装置的其他元件中，例如，在定位板1830、下铰链区域510和上铰链区域505中可以包括结合的弹簧元件。

虽然，通过上面结合附图和详细的说明，描述了本发明的方法和设备的优选实施例，应当理解，本发明不受上述公开实施例的限制，而且，在不脱离本发明构思范围的条件下，可以获得多种再设计和修改的方式，而本发明的构思记载在本发明的权利要求书中。

例如，可调整的铰接定位器可以被用于折叠式双耳机、可折叠便携式计算机屏幕、以及各种具有可以相互倾斜部件的机器设备中。

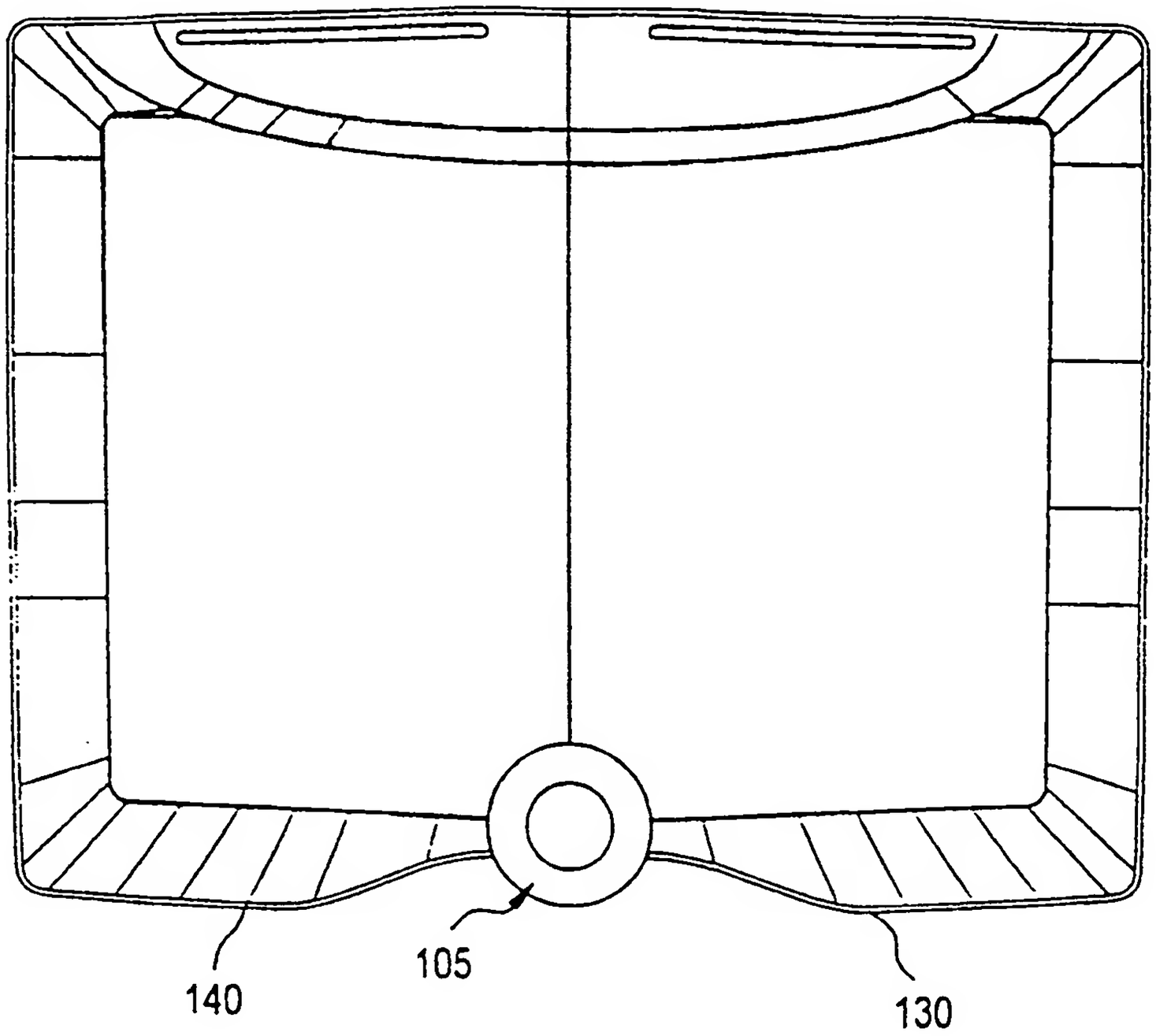


图 1A

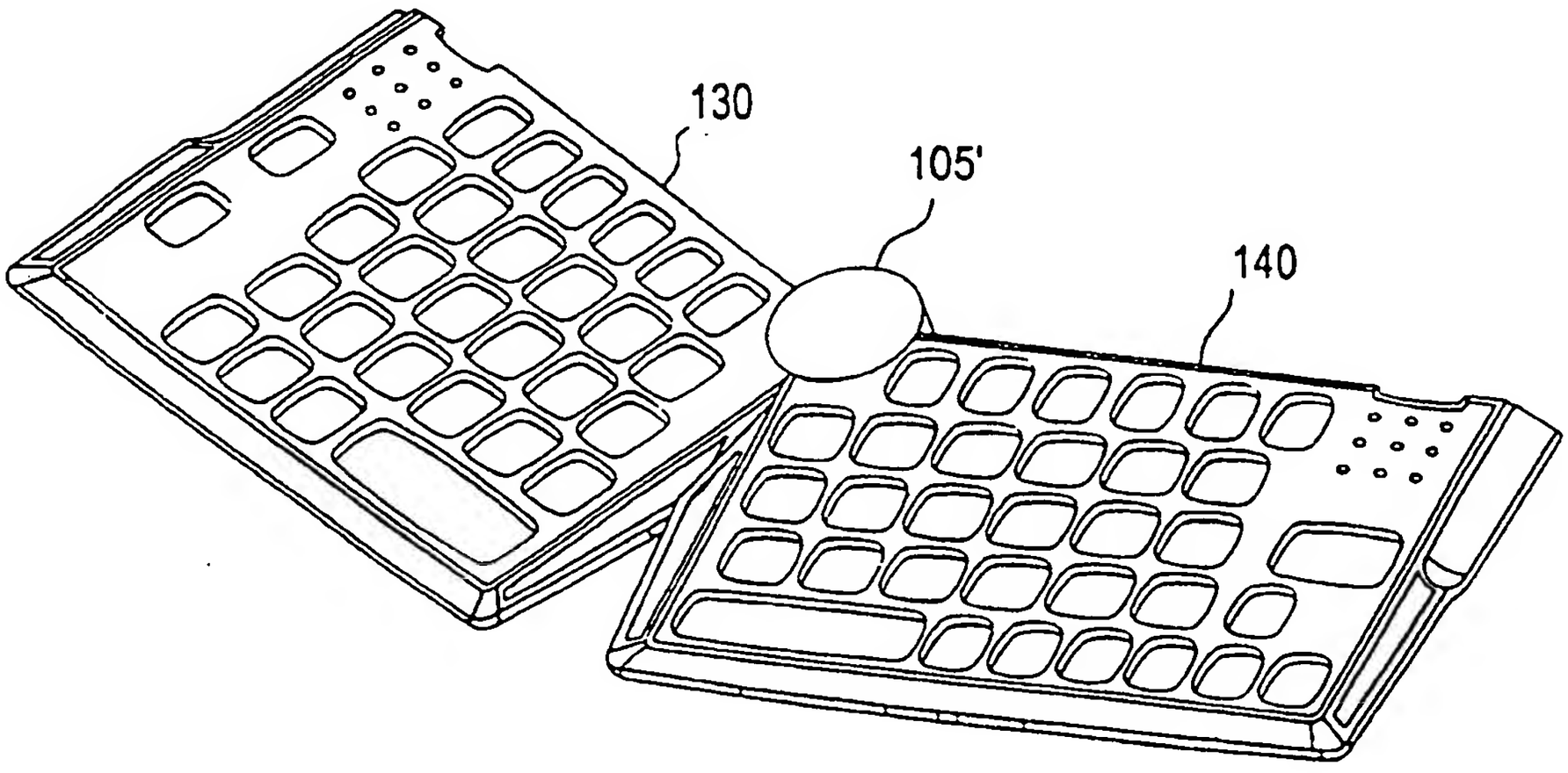


图 1B

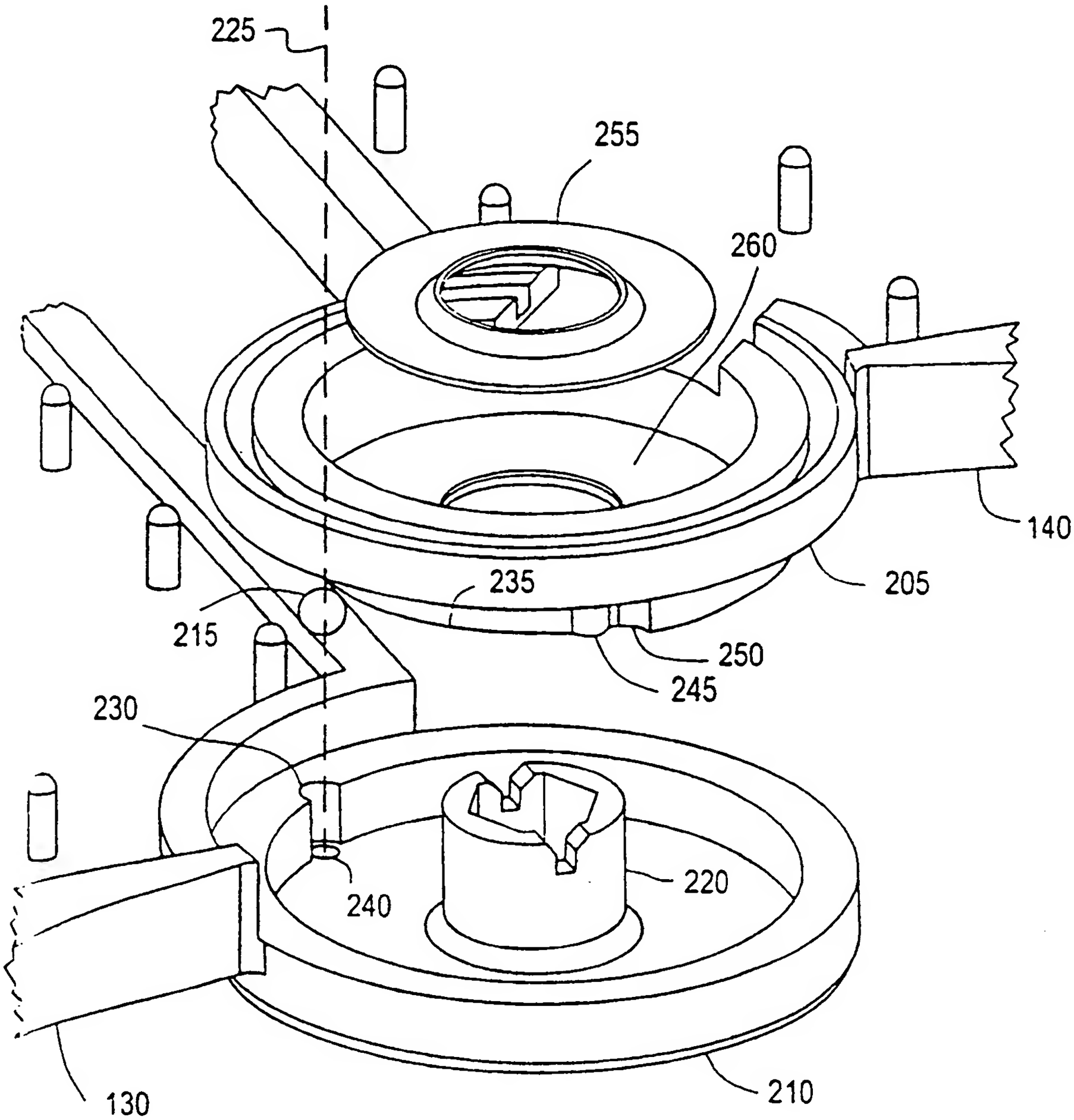


图 2A

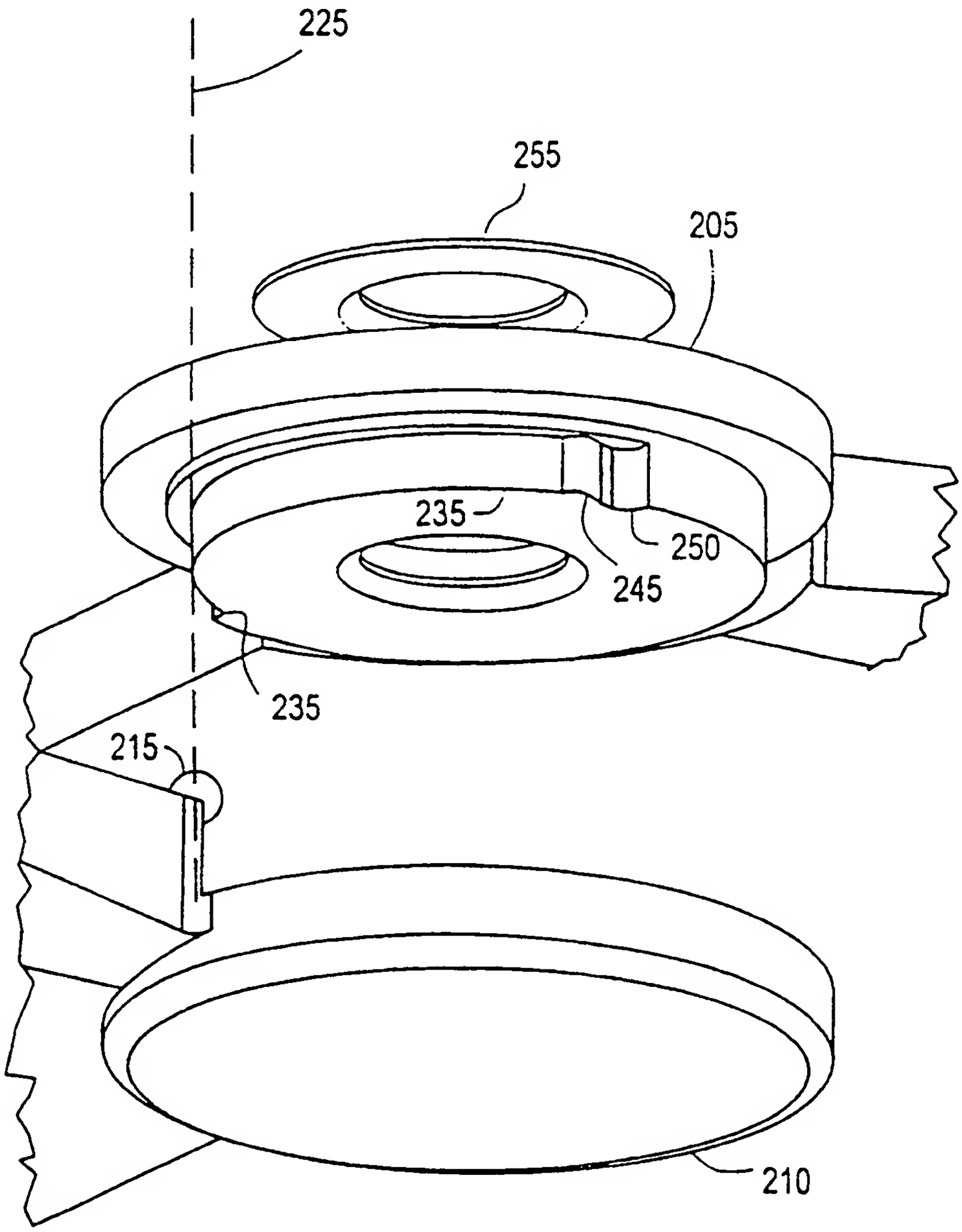


图 2B

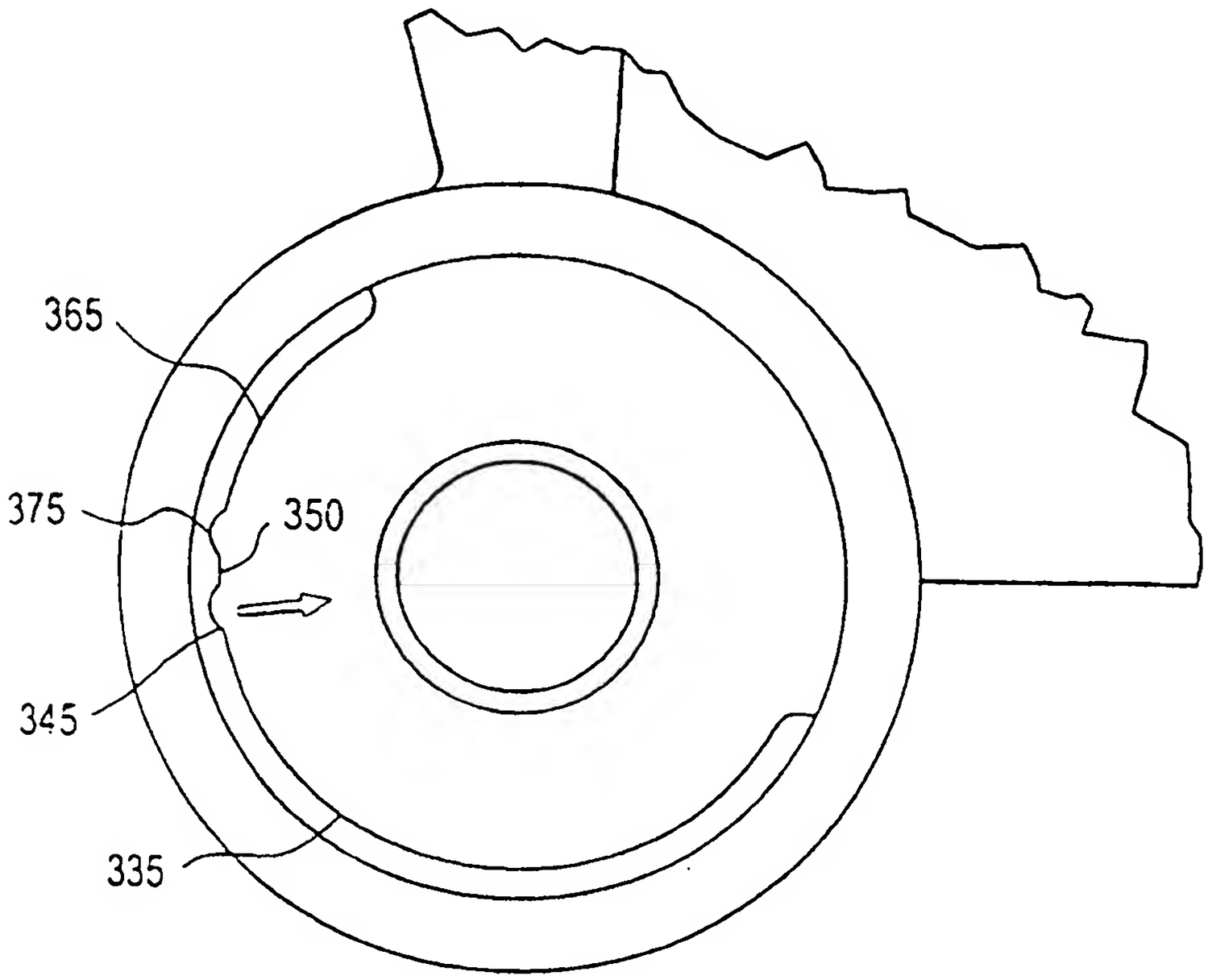


图 3A

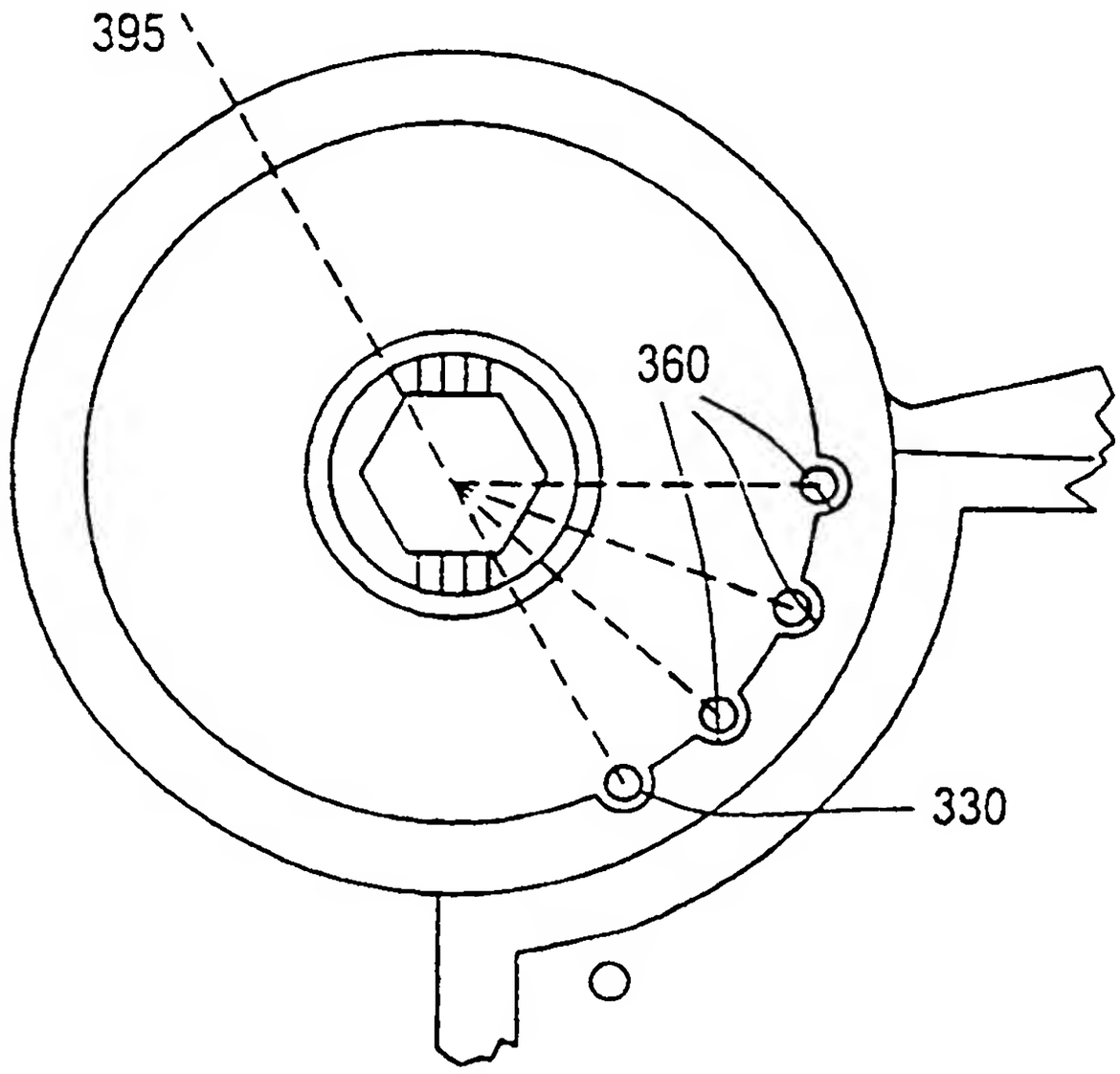


图 3B

图 4A

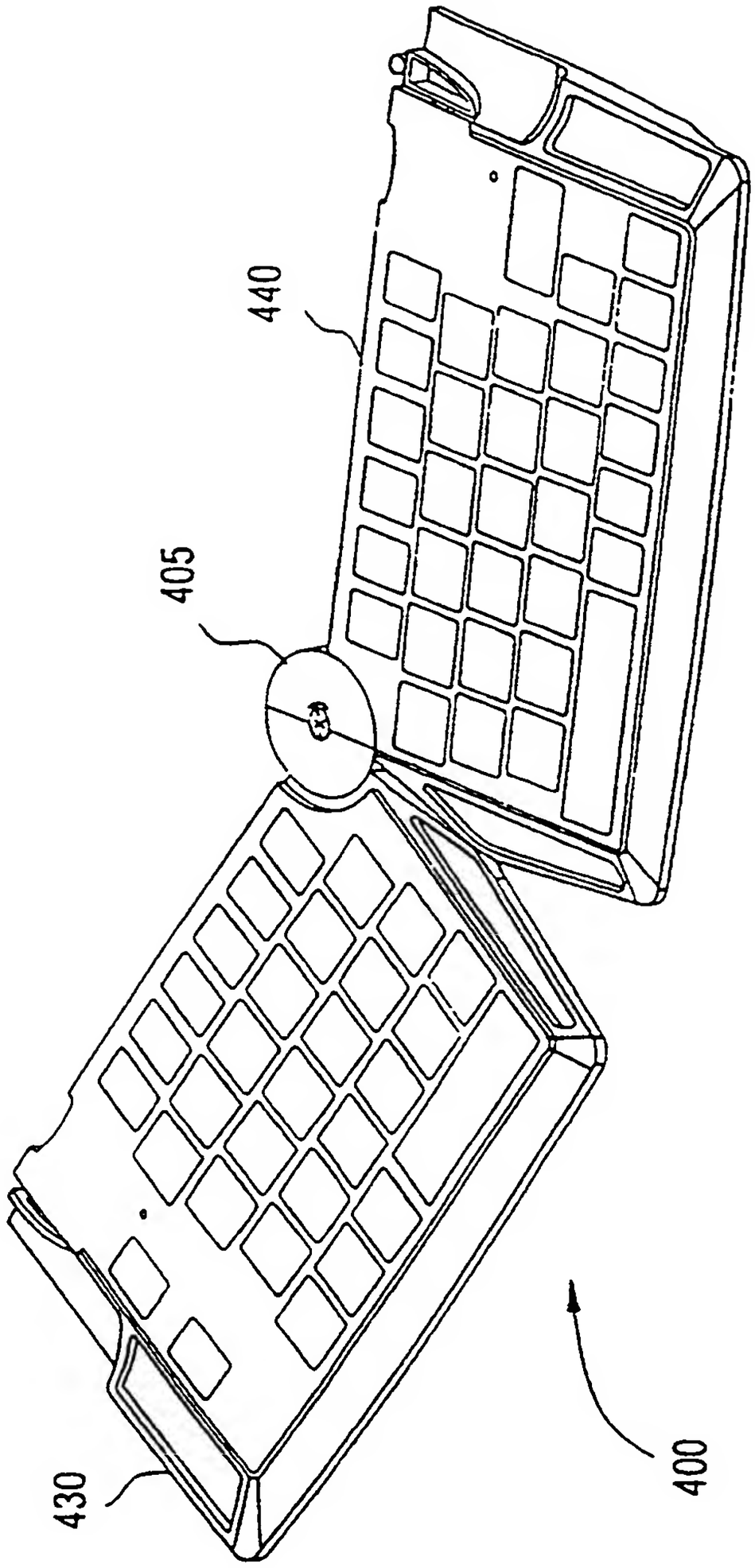
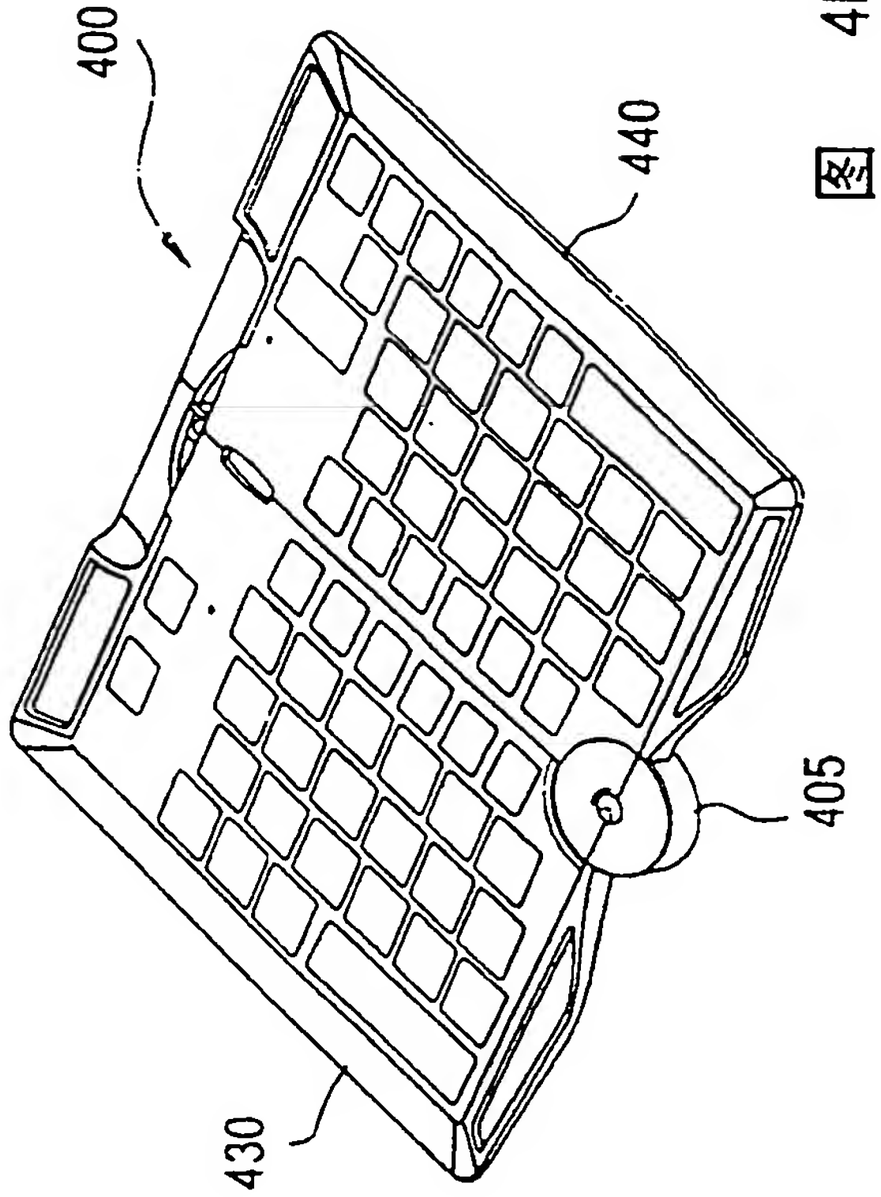


图 4B



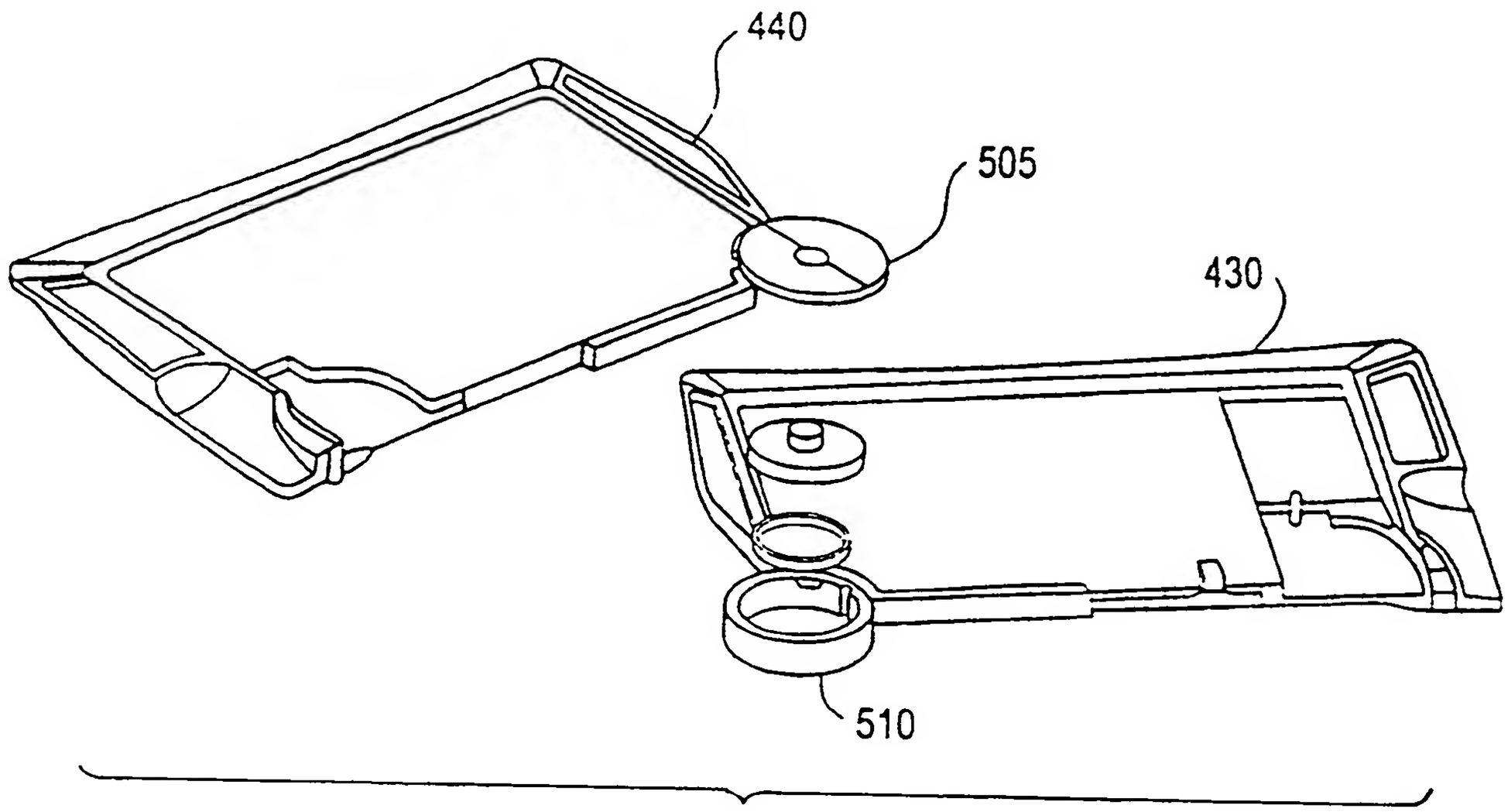


图 5A

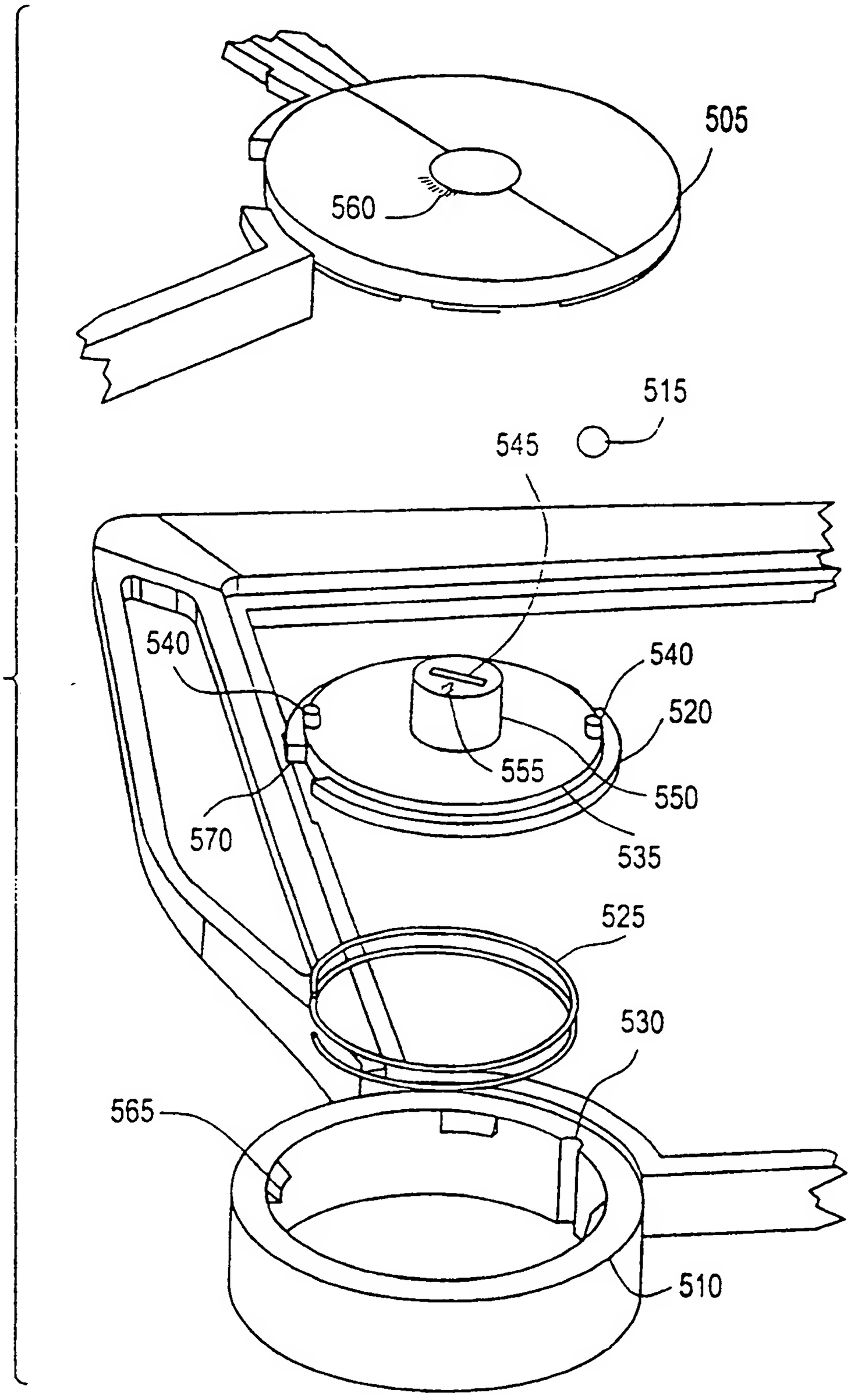


图 5B

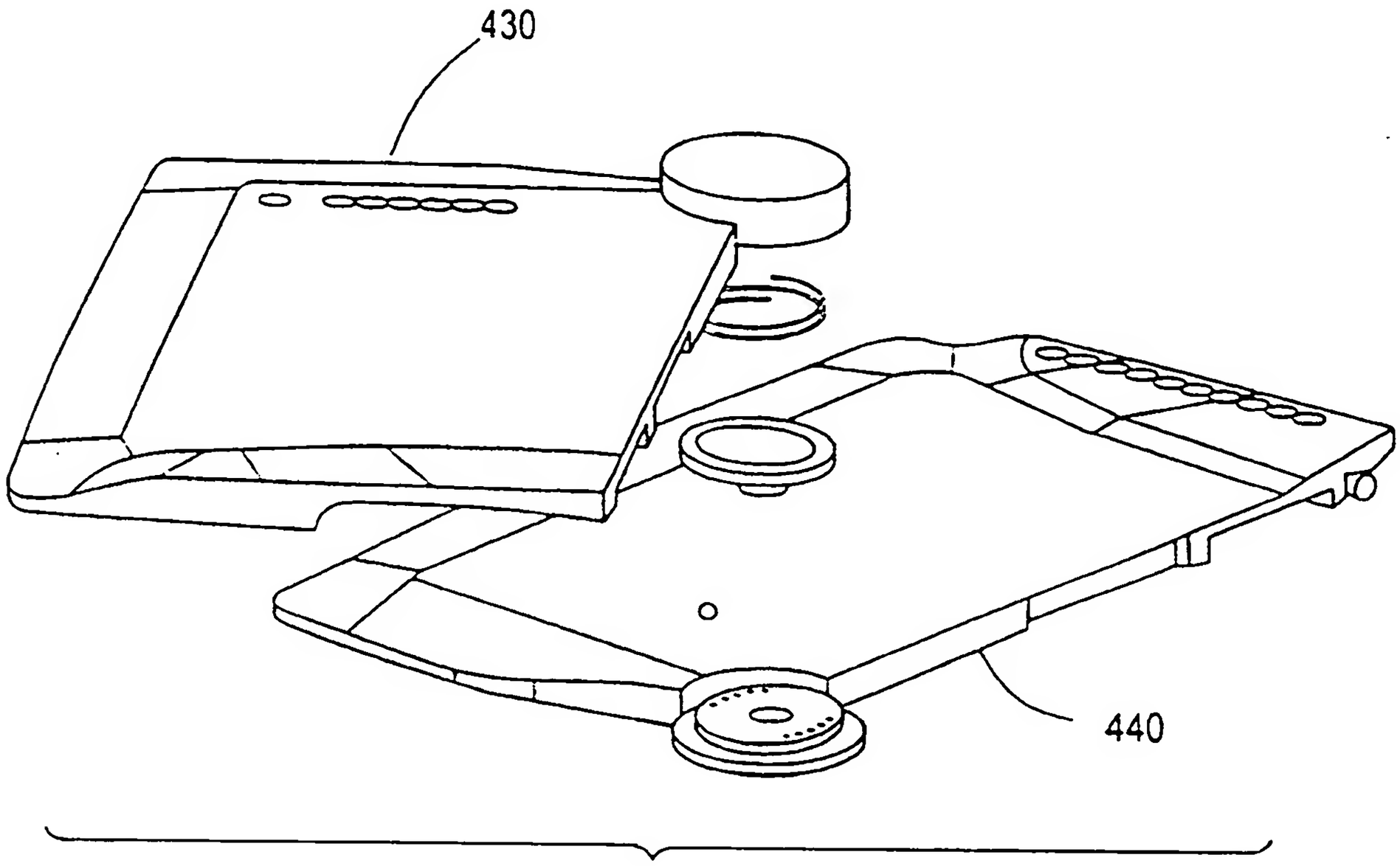


图 6A

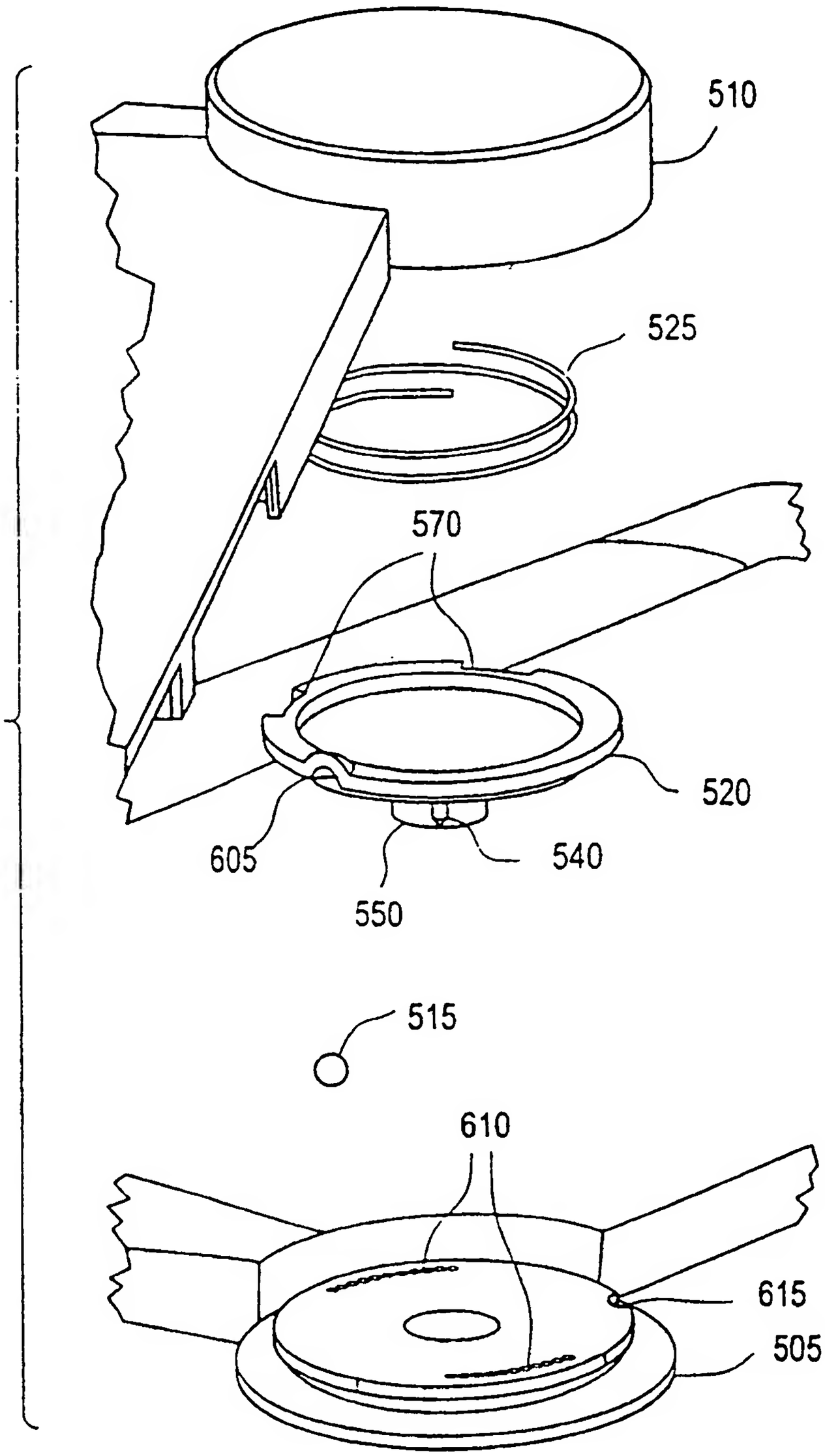


图 6B

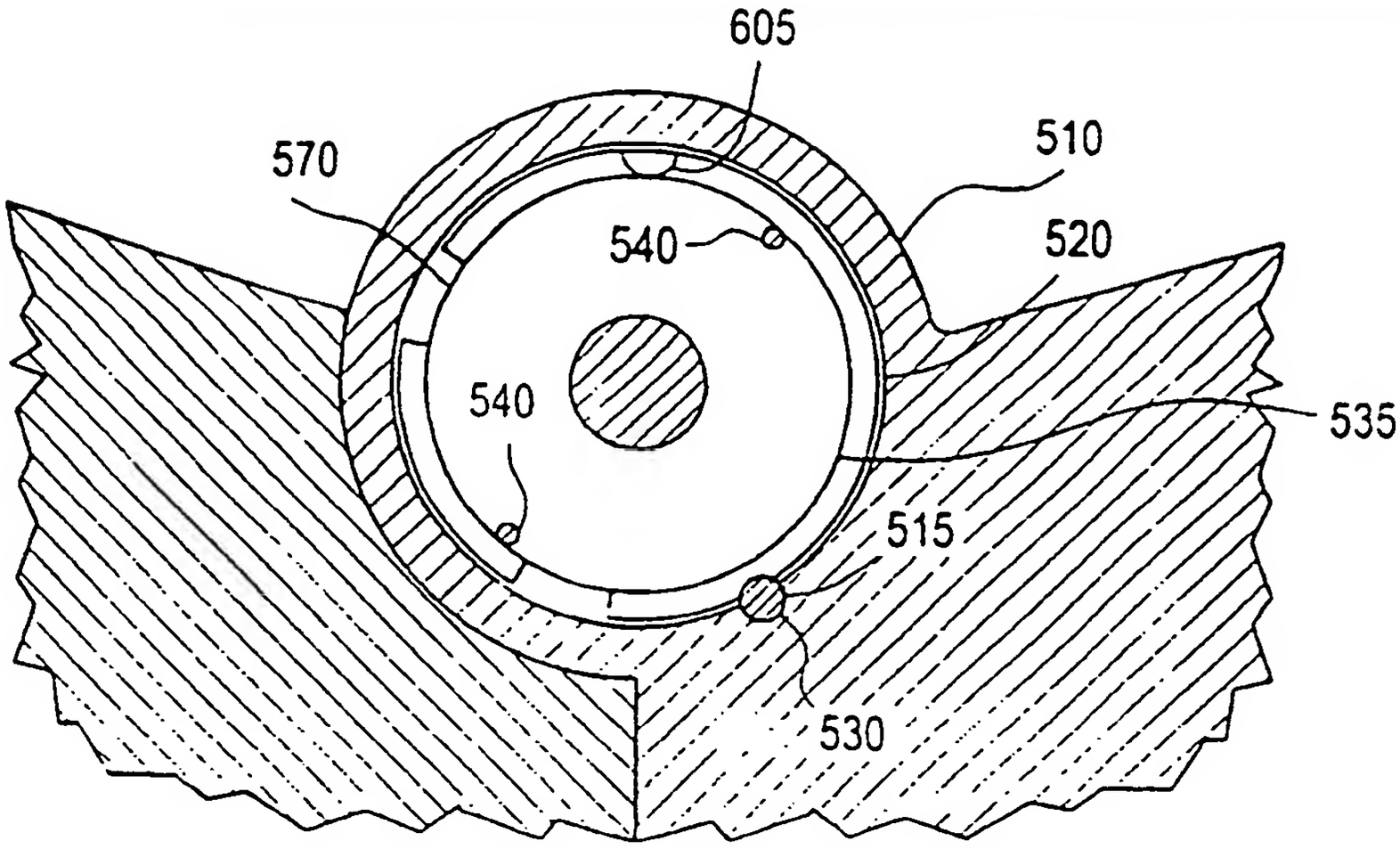


图 7B

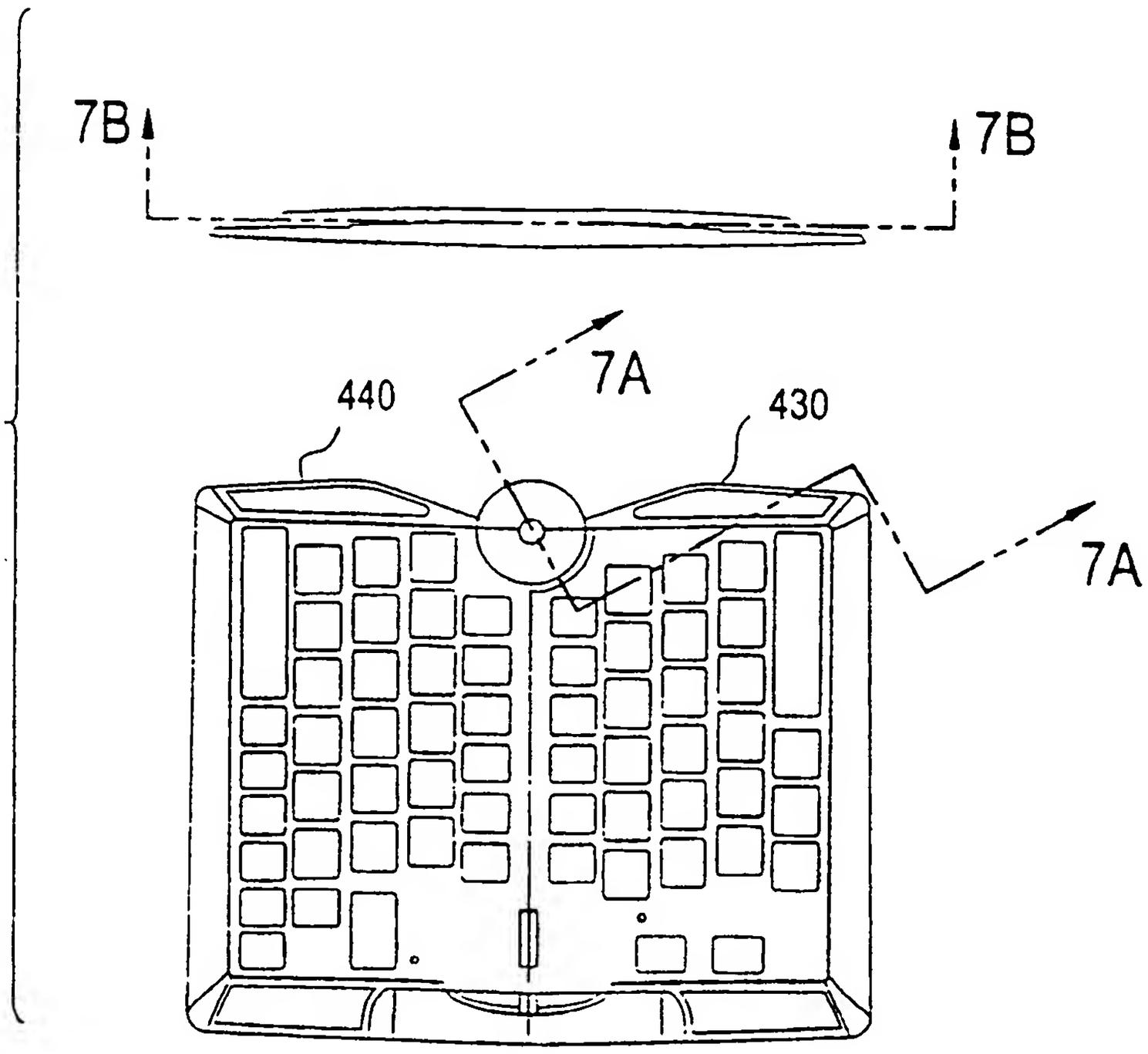


图 7

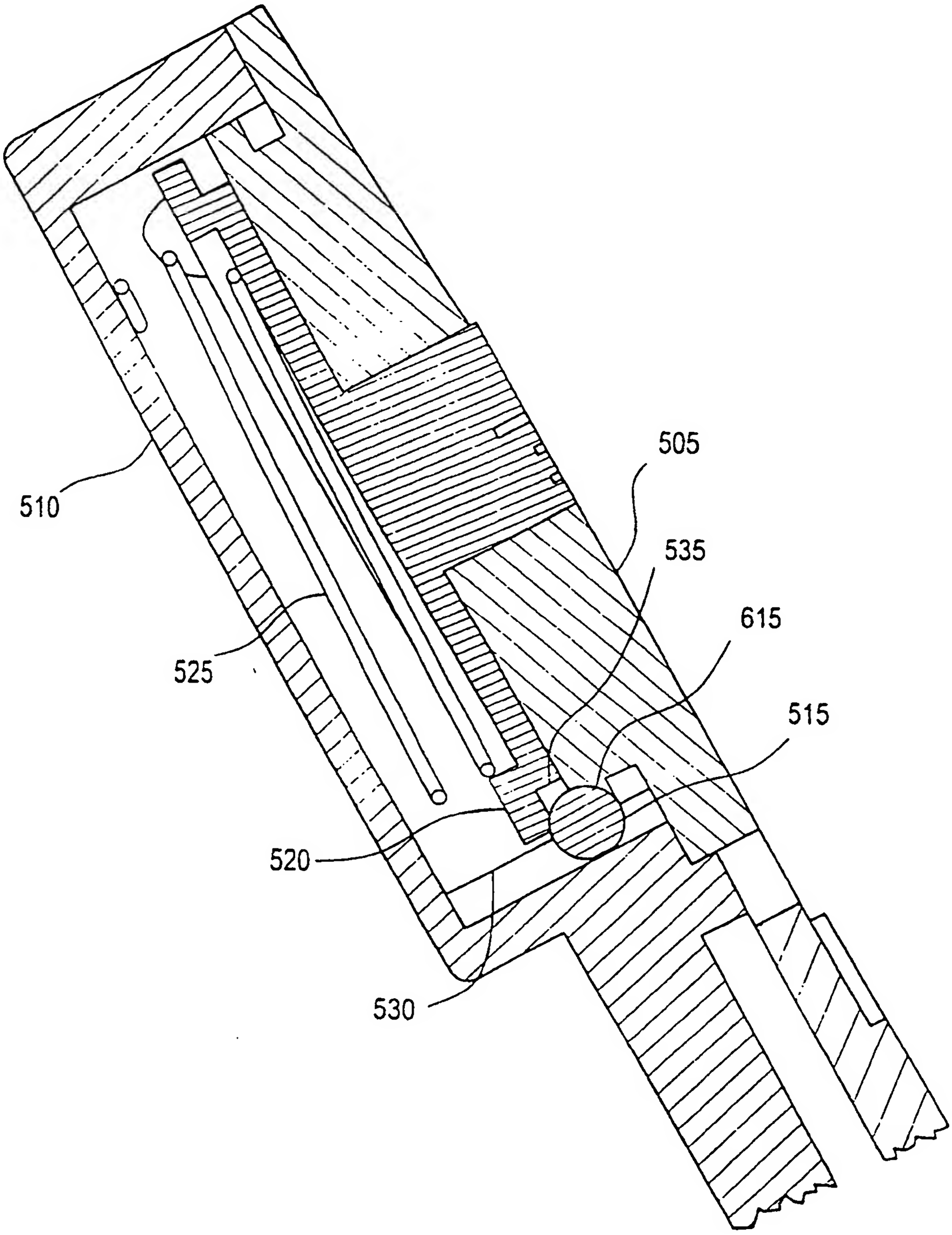


图 7A

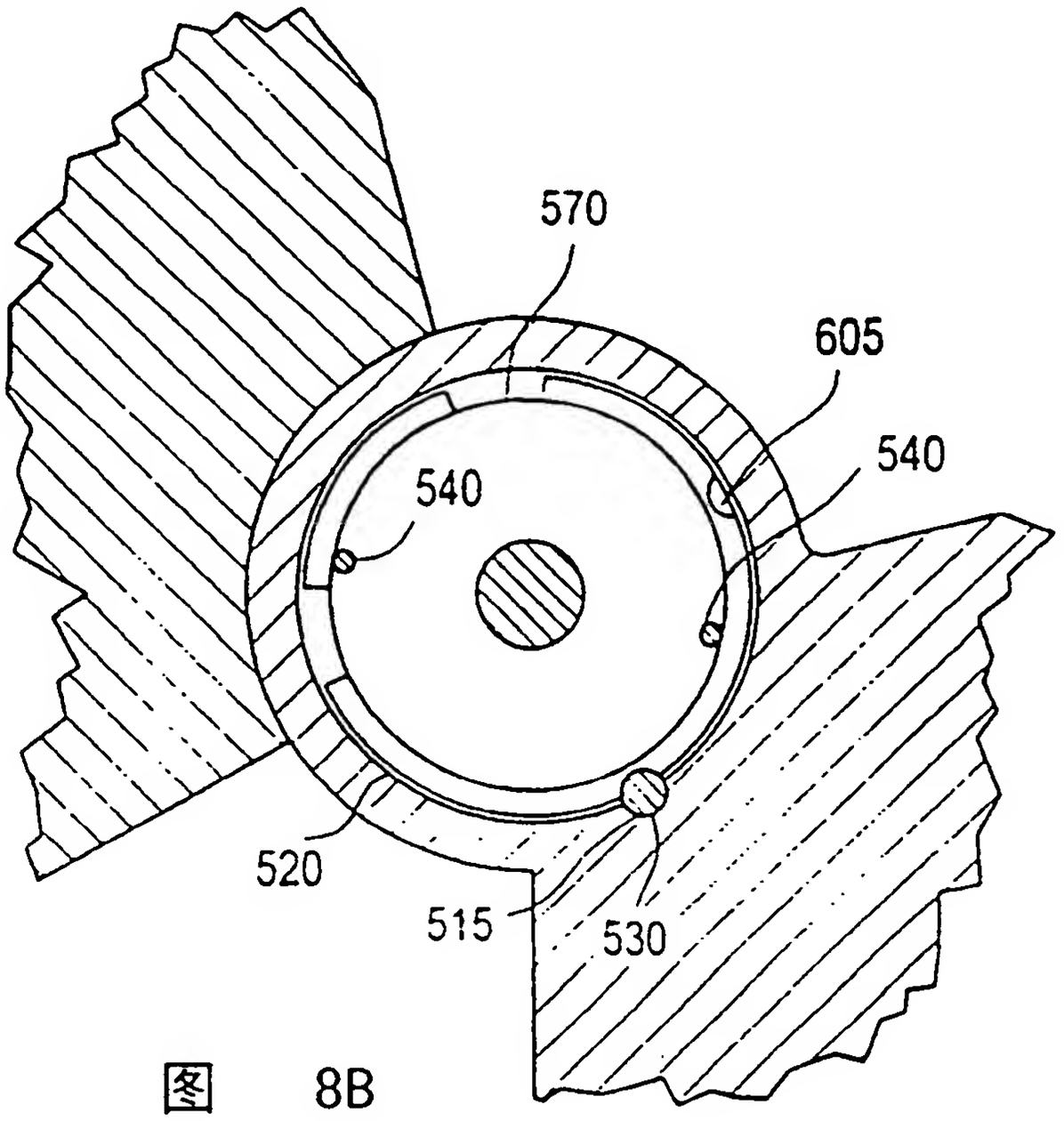


图 8B

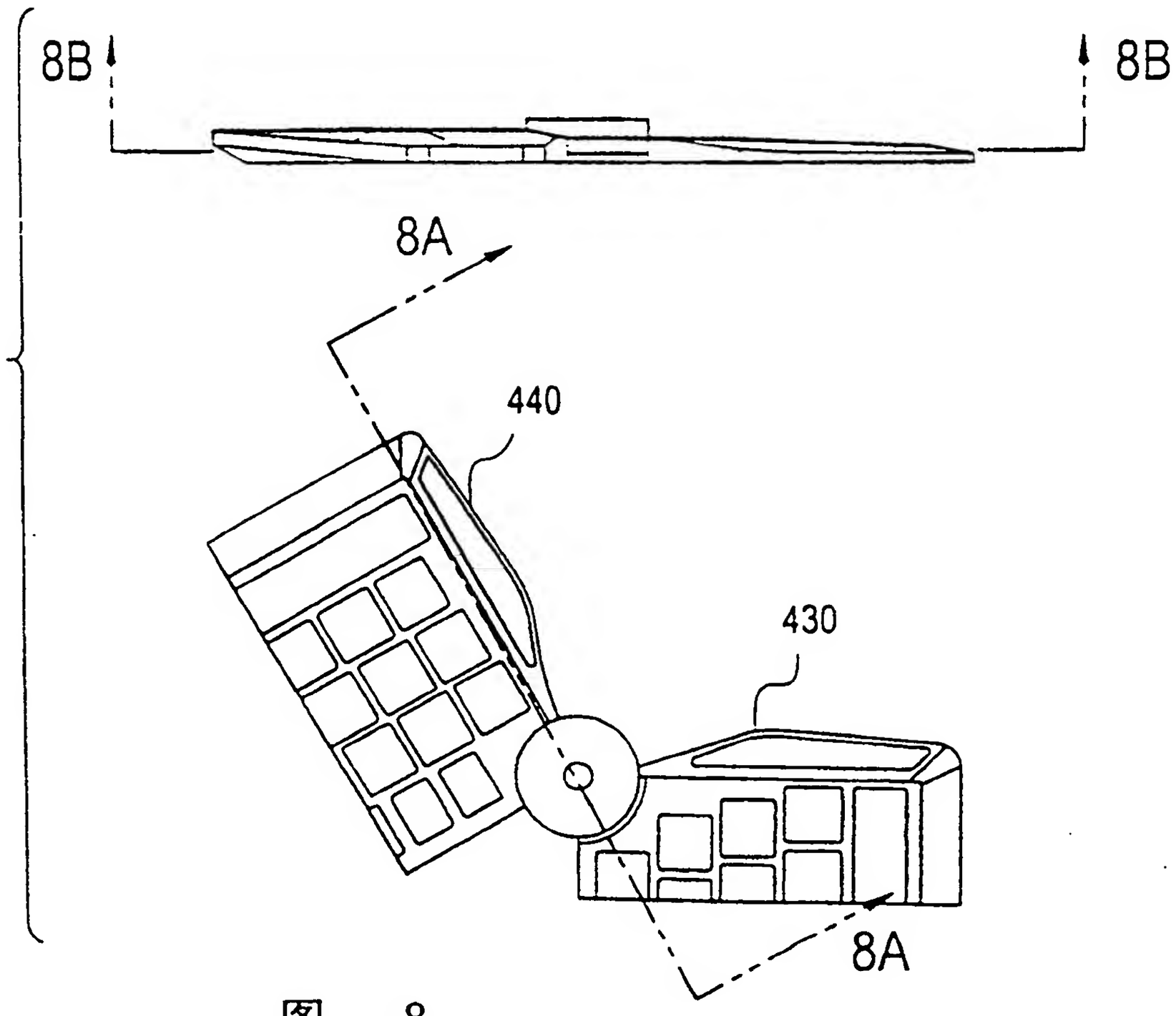


图 8

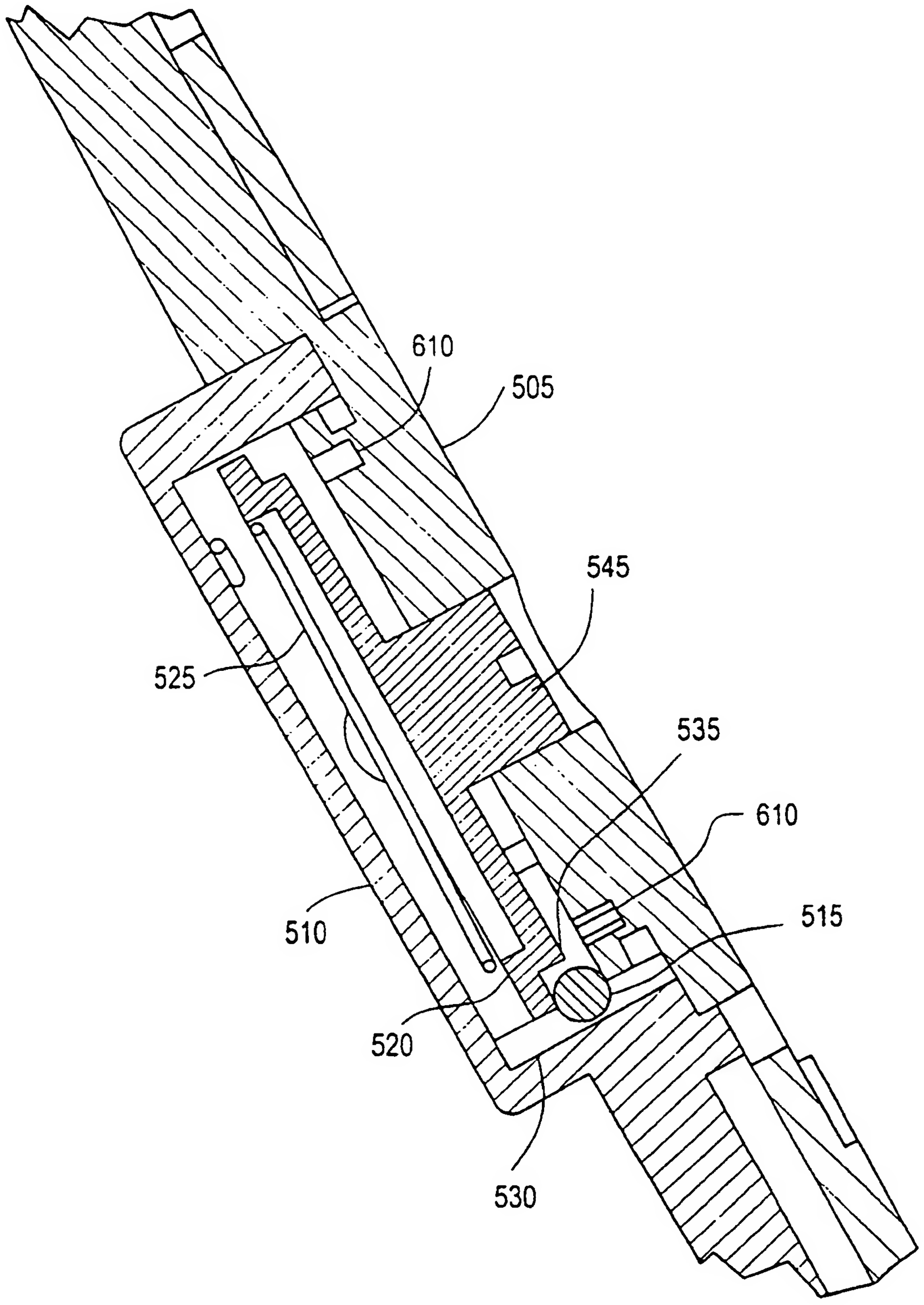


图 8A

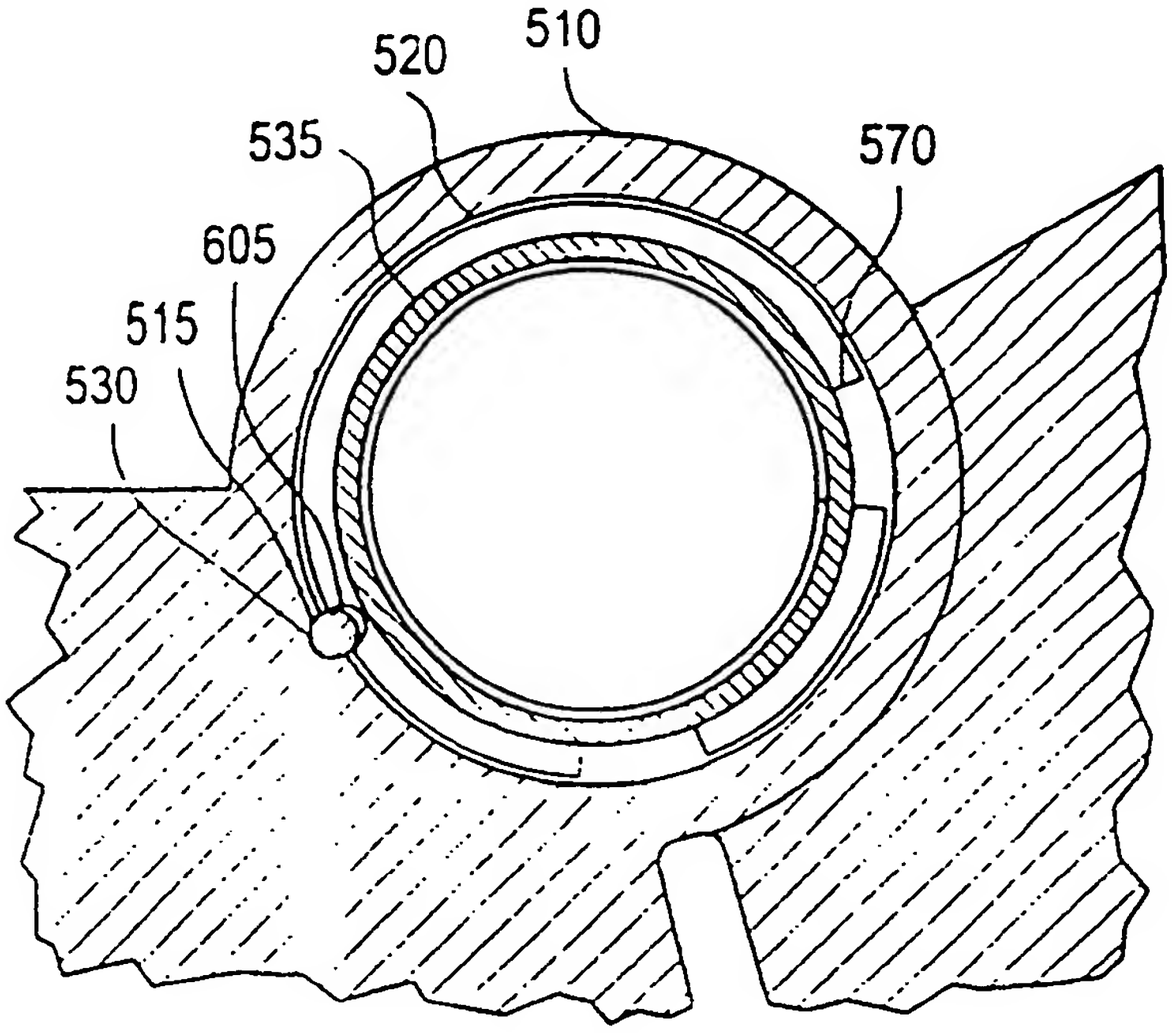


图 9B

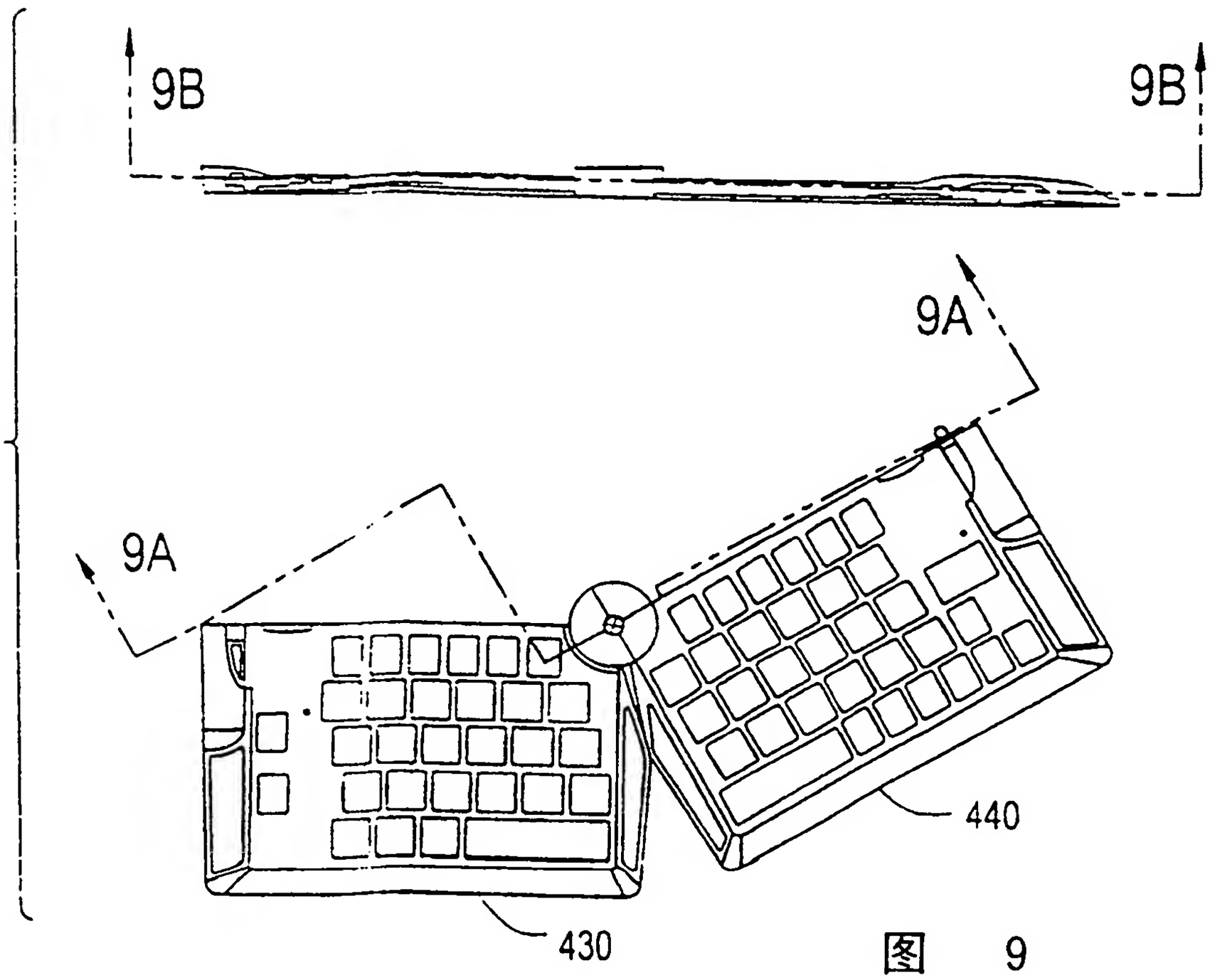


图 9

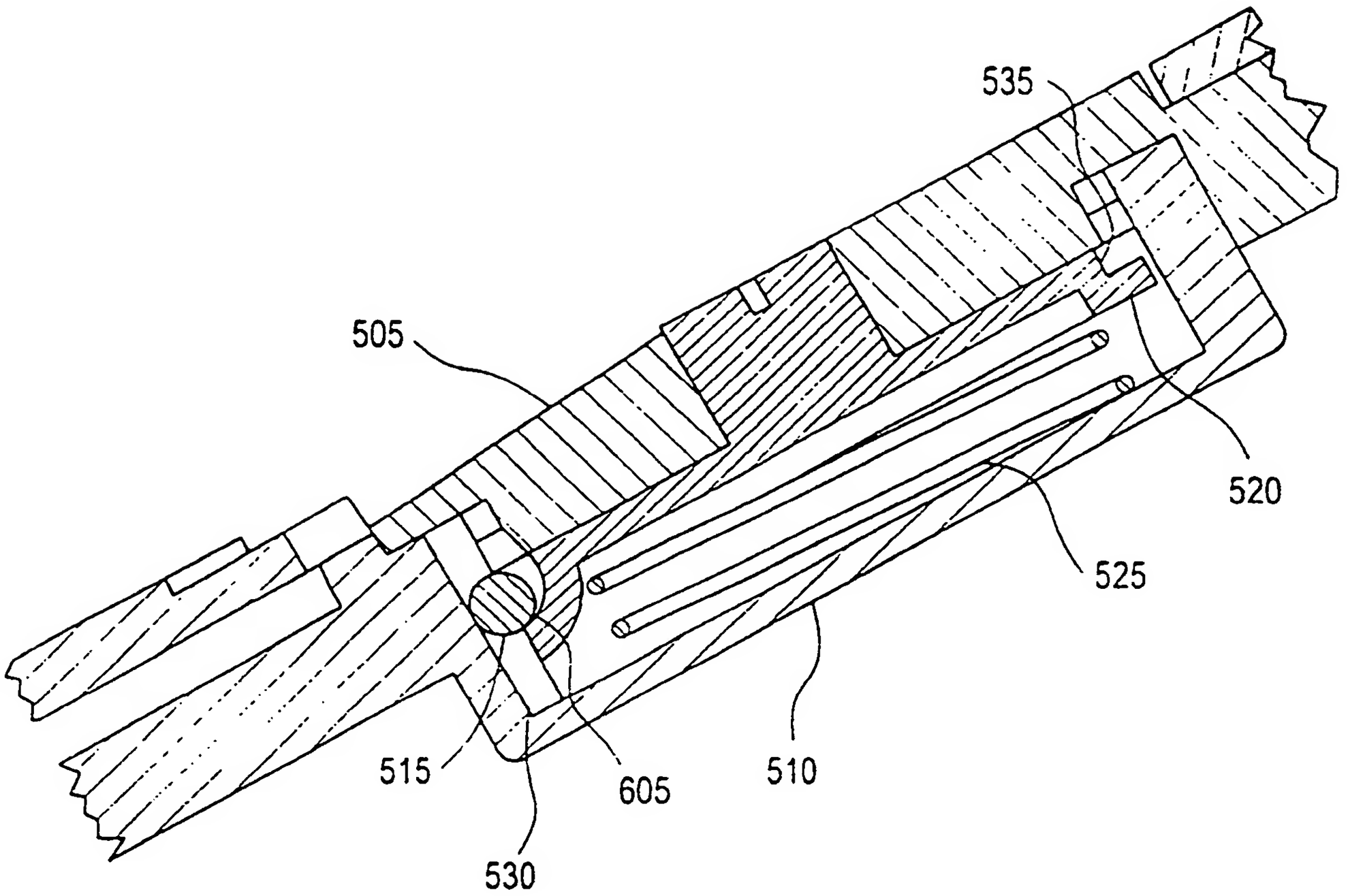


图 9A

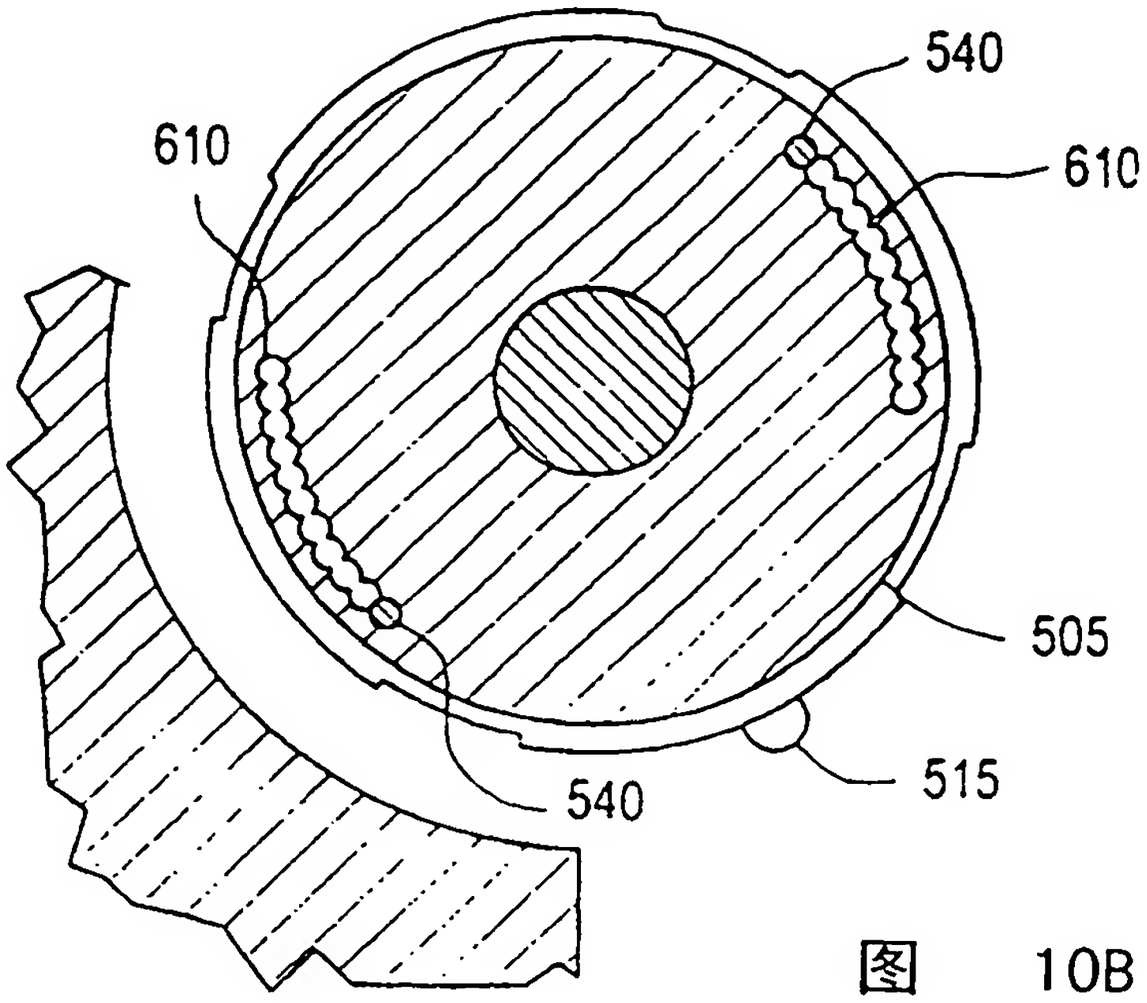


图 10B

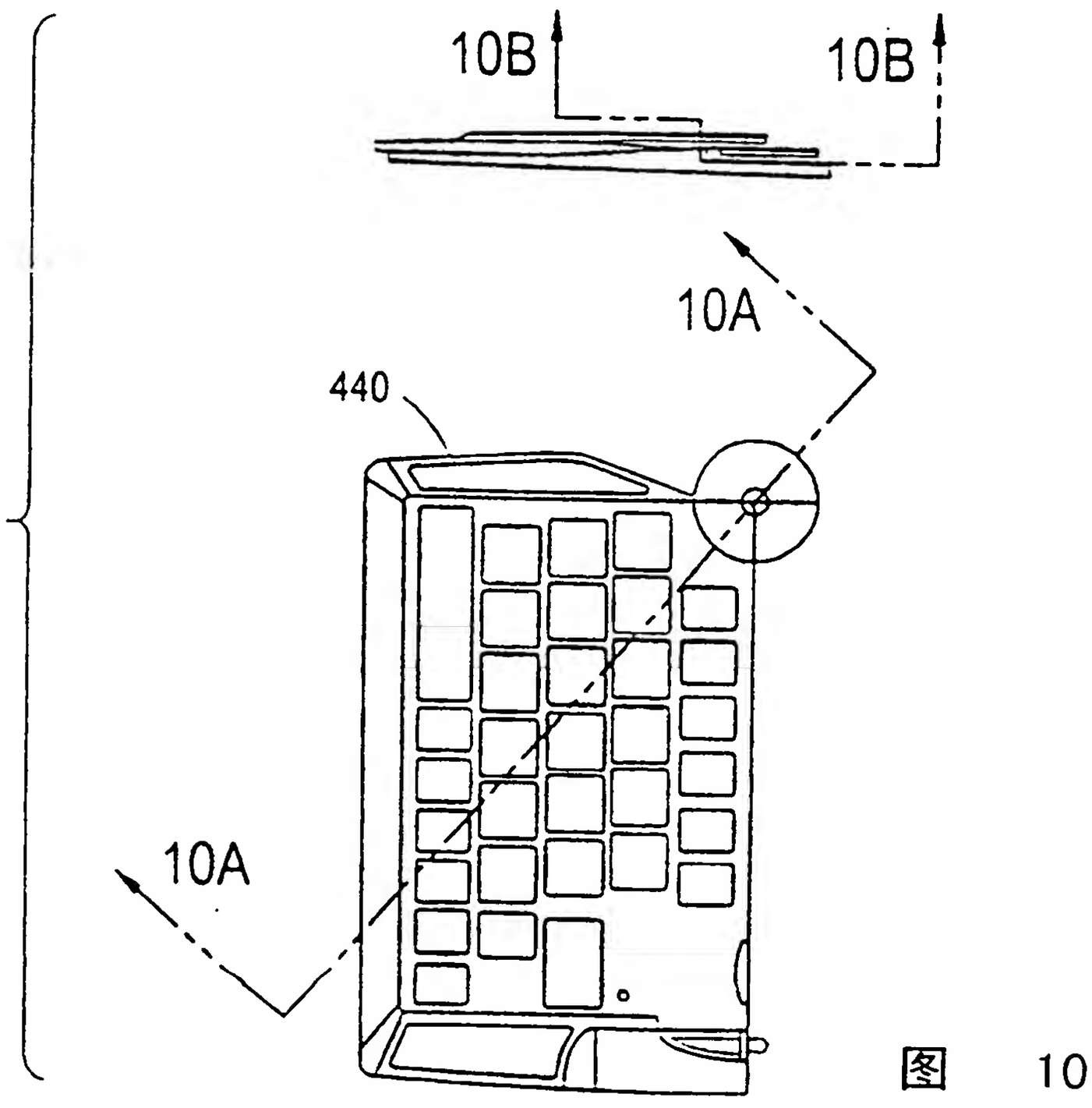


图 10

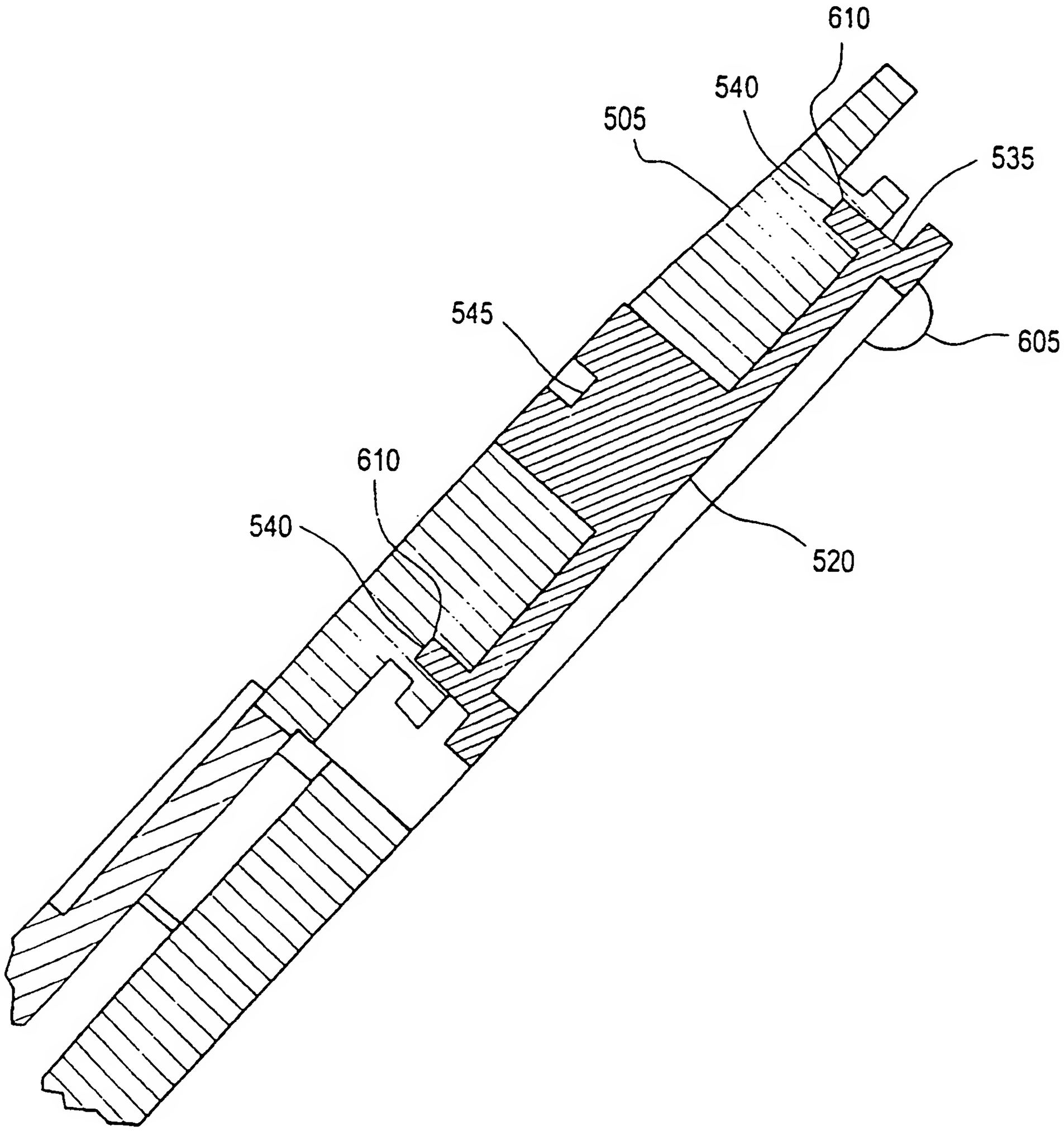


图 10A

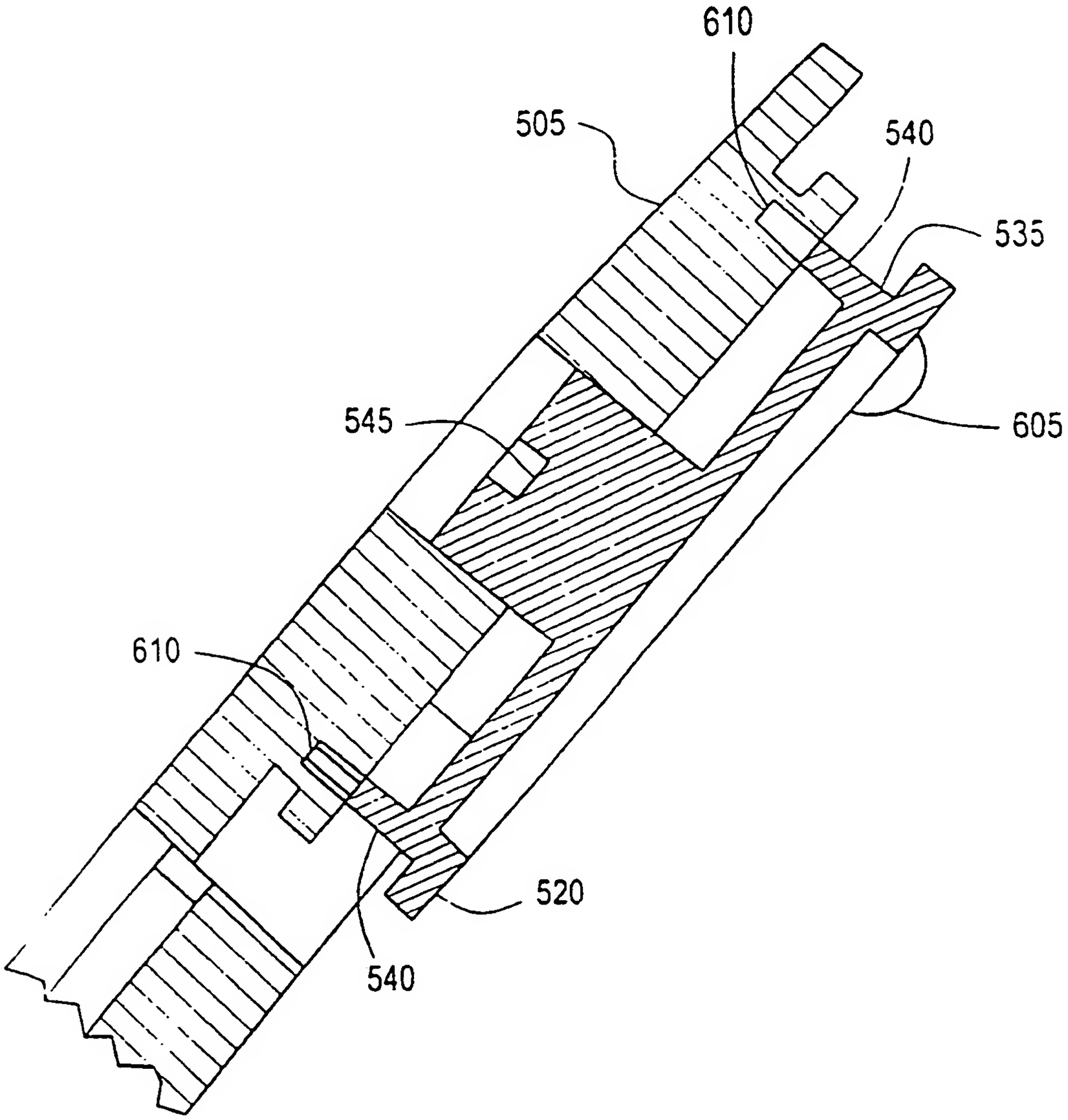


图 11A

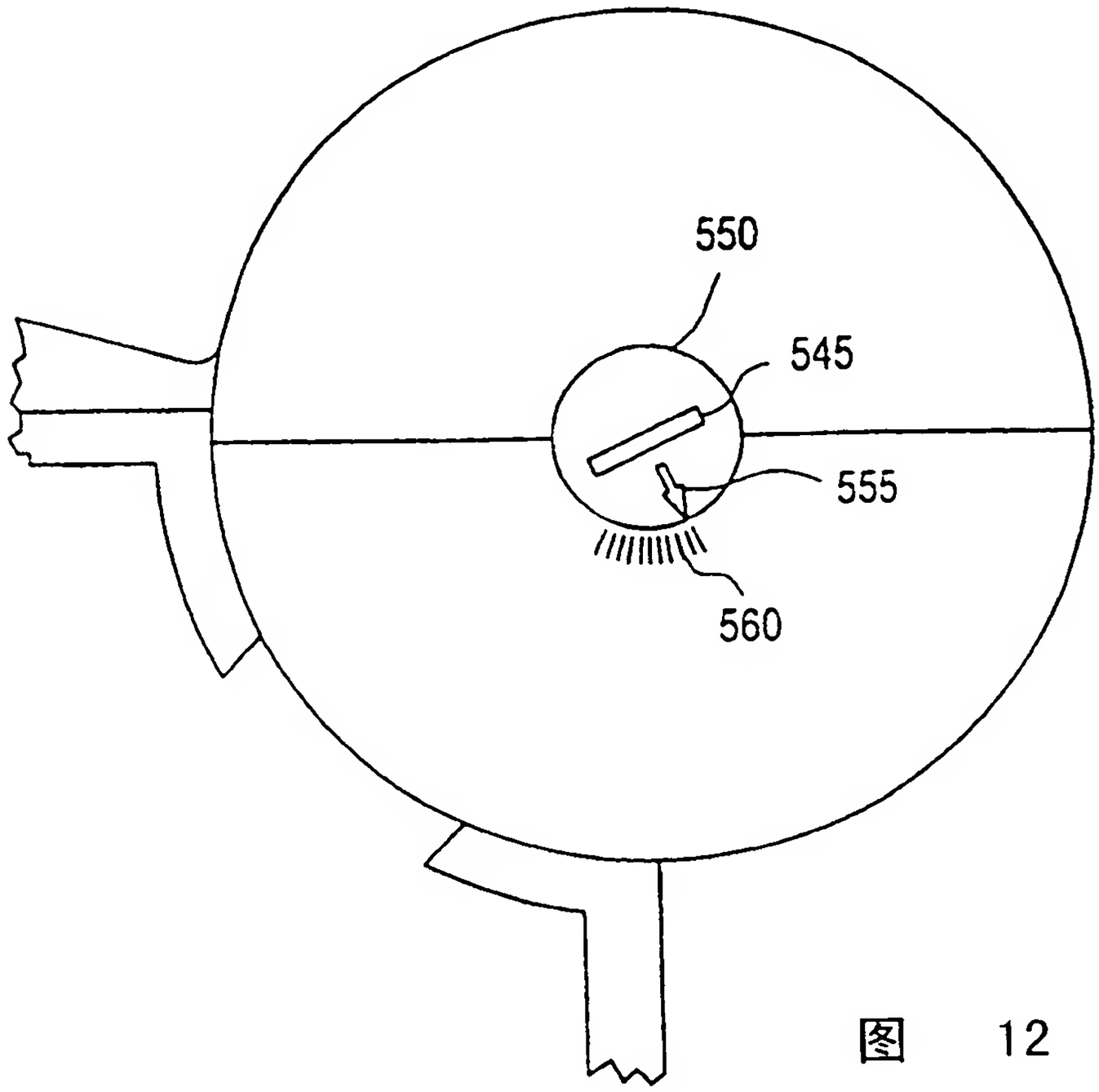


图 12

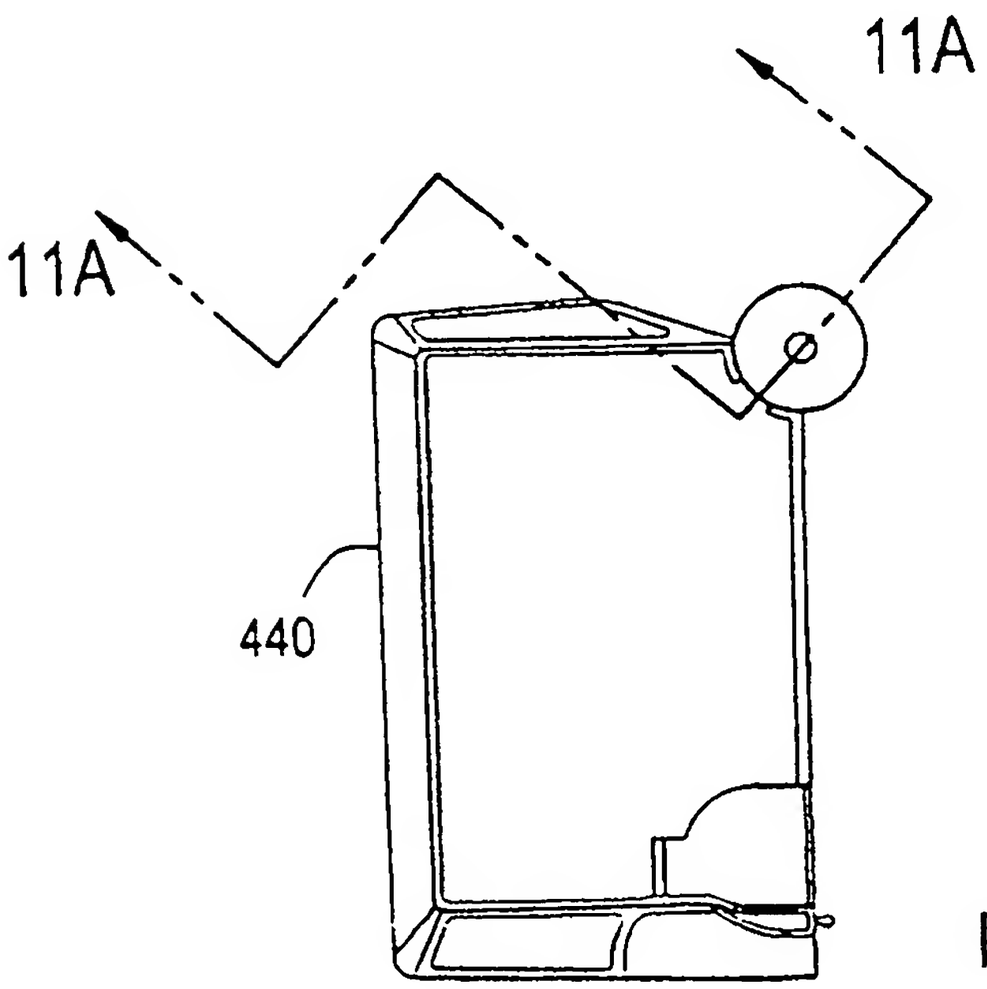


图 11

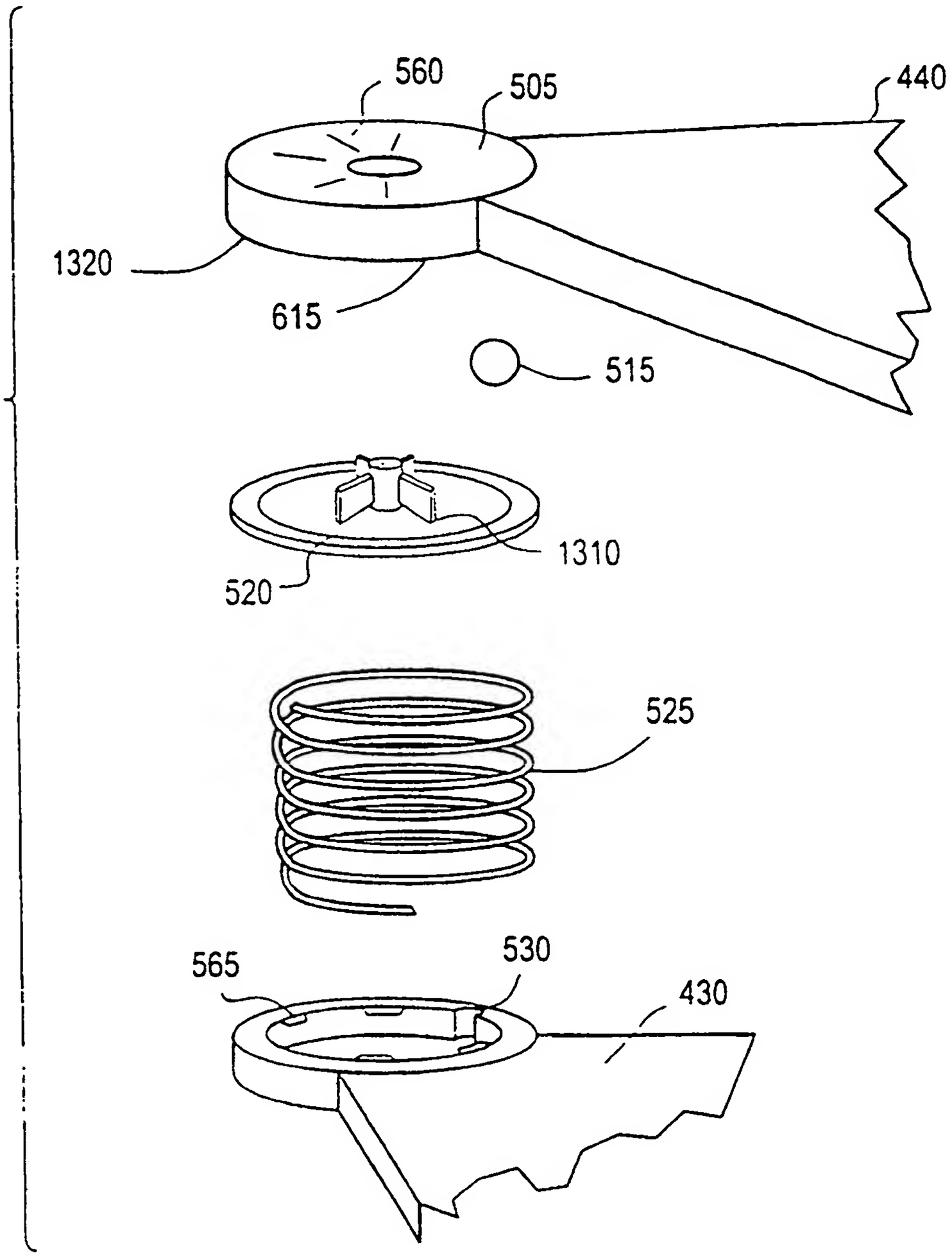


图 13

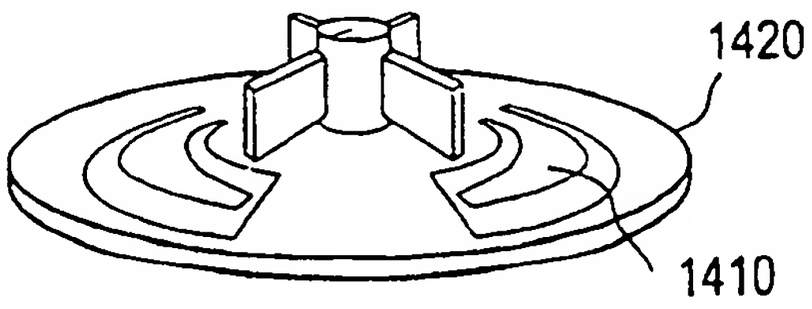


图 14

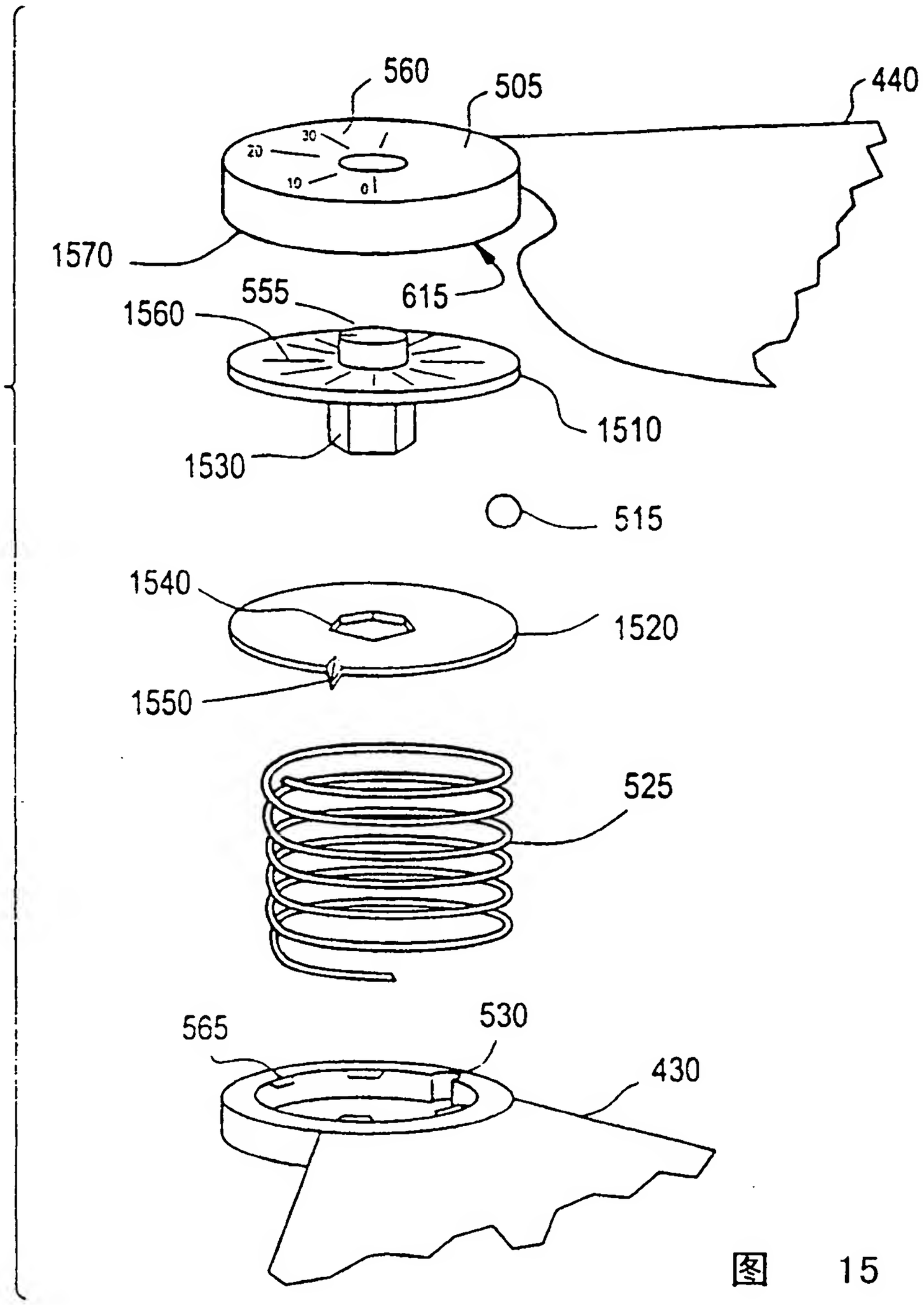

560
505
440
30
20
10
0
1570
615
555
1560
1510
1530
515
1540
1520
1550
525
565
530
430

图 15

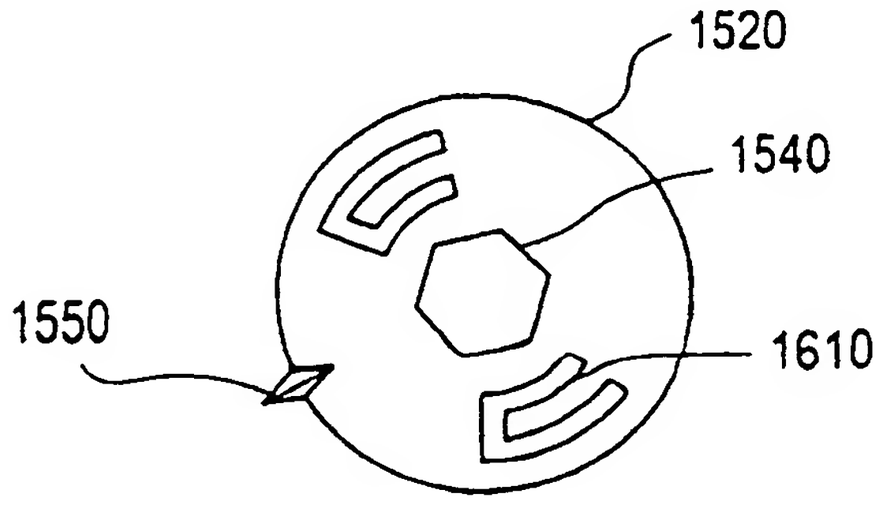
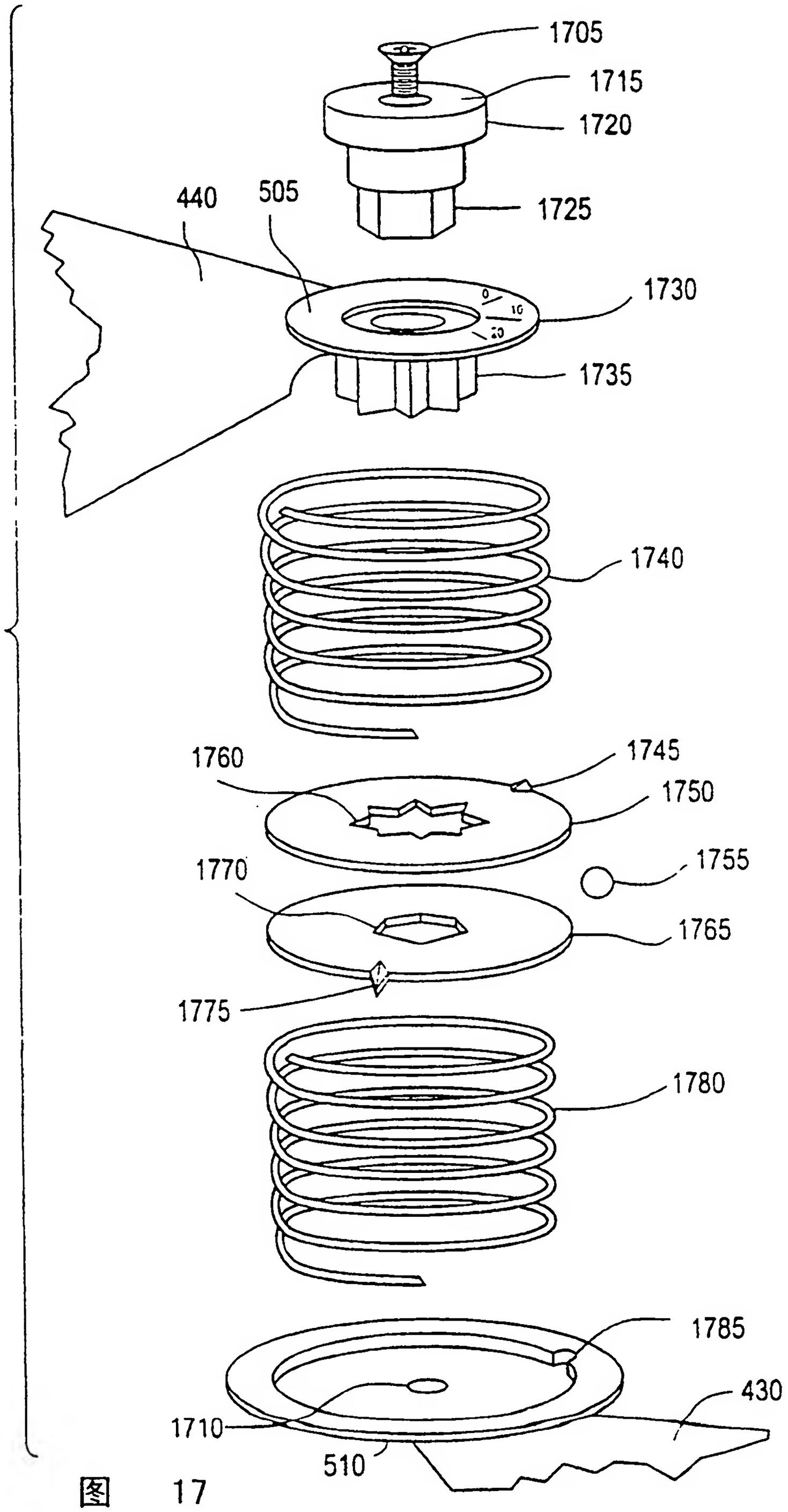

1520
1540
1550
1610

图 16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1715
1720
1725
440
505
1730
0
10
20
1735
1740
1760
1745
1750
1755
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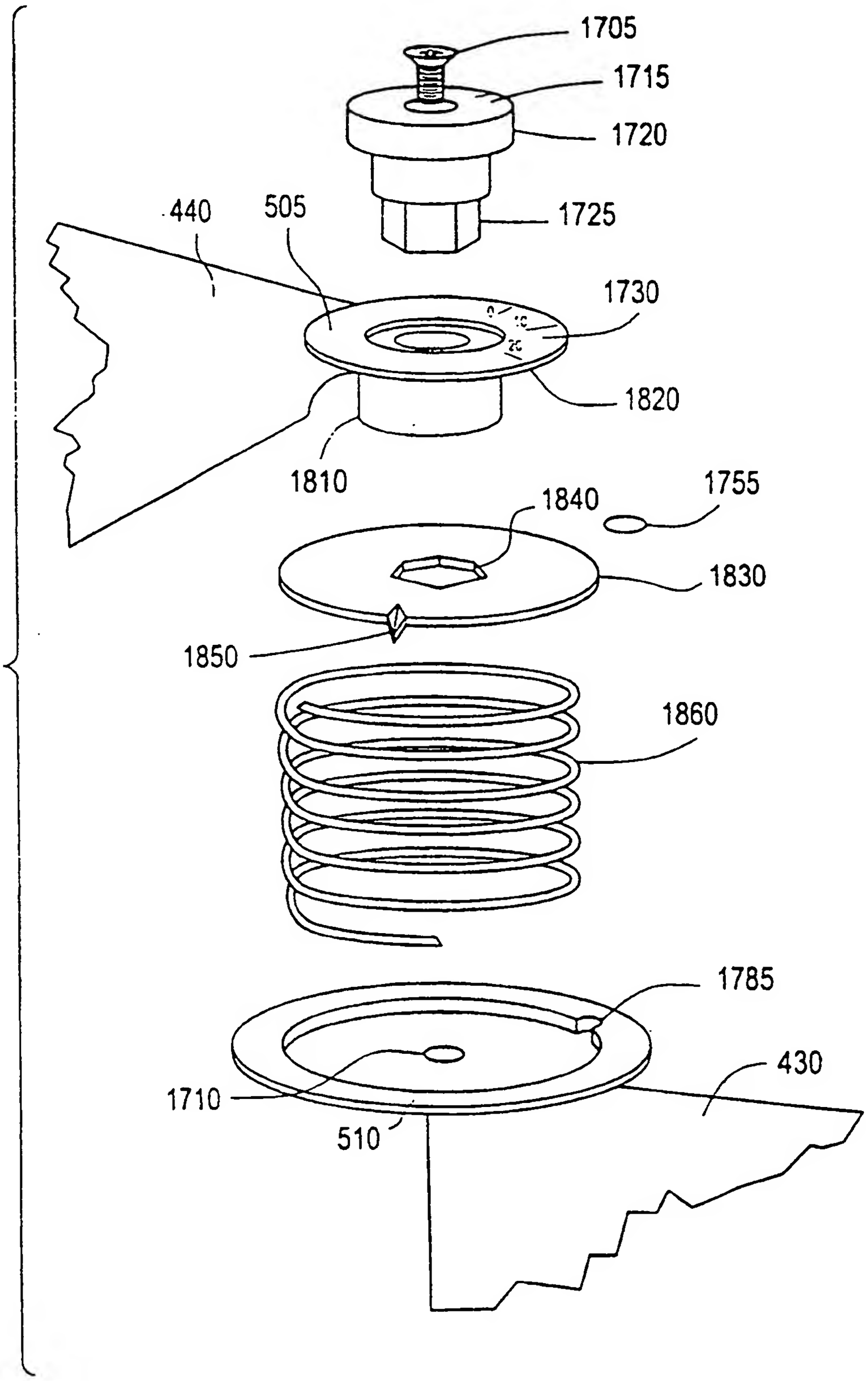
1765
1775
1780
1785
430
1710
510

图 17


1705
1715
1720
1725
440
505
1730
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1840
1755
1830
1850
1860
1785
1710
430
510

图 18

#Title:
Electronic device and method for regulating hinged positioning
#PublicationNumber:
CN1113147C
#PublicationDate:
2001-01-03
#Inventor:
PATTERSON G S (US); SNYDER T D (US)
#Applicant:
ERICSSON INC (US)
#RequestedPatent:
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#Abstract:
ATTENTION - DATA WAS TAKEN FROM US6195839
Two pivoting portions of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements are forcibly disengaged from one set of adjusting recesses in the adjustable hinge, then rotated to different adjusting recesses of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses. This mechanism permits a multitude of operable angles to be selected. Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to connect two v-keyboard halves, a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand.
#Description:
ATTENTION - DATA WAS TAKEN FROM US6195839
BACKGROUND OF THE INVENTION

1. Technical Field of the Invention

The present invention relates to hinged detents, and in particular, to hinged detents with simplified structures and adjustable operable angles of rotation.

2. Description of Related Art

Keyboards have long been used as input devices for both mechanical and electrical machines. Recently, keyboards have been used as the predominant input device for electronic devices. For example, keyboards are vital components in computers and other terminals, such as versatile telephones.

Unfortunately, the original design of the keyboard incorporates a single rectangular block of keys. This design causes discomfort to many users. To remedy this deficiency, many modern keyboards have been redesigned by dividing the single

block of keys into two smaller blocks that are angled apart from one another, often called v-keyboards. Many keyboard users consider this design to be far more ergonomic. In fact, it alleviates or even eliminates pain and discomfort for many of these users.

Prior art keyboards typically employ one of two techniques to create the v-angle. First, the two halves may be separate with no connecting hinge. This technique results in a fragile and unreliable v-angle. Second, the halves may be connected by a hinge that is secured with a screw. This technique, though, results in a hinge that is difficult, time-consuming, and cumbersome to use, especially in portable devices. In short, no prior art v-keyboard simply and effectively secures and maintains a v-angle.

Looking at small portable consumer electronics products in general, many have hinges that incorporate detent mechanisms. Examples include cell phone flip doors, portable cassette player doors, and swivel antennas. Usually, these prior art detent hinges are composed entirely of plastic components, which is undesirable inasmuch as plastic parts do not wear well against each other. Furthermore, assembly of prior art detents is often difficult.

Many of these products integrate simple detent mechanisms into the plastics of the hinge itself. For example, there is a post-and-hole design wherein a rounded post element protrudes from one side of the hinge towards the other, which has a hole or recessed area for the post to nest into. As the hinge rotates, the post rides out of the hole and slides, under stress, into a new hole. The post then snaps into the new hole, thereby creating the detent feel and holding the product in the operable detent position. Assembly usually consists of forcing the two halves together until they snap together in alignment. Other more complicated prior art designs include camming surfaces and springs in the hinge mechanics.

The primary deficiency of prior art detents is that they wear out quickly. This is especially true of detents molded into the plastics of the hinge because plastics often do not wear well against each other; consequently, the post side usually breaks off or wears away. Nevertheless, this design is frequently used because of its low cost and relative ease of assembly. While it is known to use different materials for parts that wear on each other, the post still tends to eventually break away in part because it is so frequently under stress for relatively long periods of time.

Another drawback to the prior art molded-in solutions is that the detent position cannot be changed, nor can the detent mechanism be easily removed if so desired. The primary drawback of the more complicated solutions, e.g., leaf springs and cams, is just that; they are more complicated. The complications usually lead to higher costs, increased assembly time, a greater number of parts, and more reliability issues. Moreover, these designs occupy significant space within the hinge itself. This is undesirable in today's consumer electronics products in which wires, circuits, connectors, etc. are routed through hinge components and therefore compete for this real estate. In fact, routing wires through the hinge is necessary when the hinge is employed in a v-keyboard because the left and right halves must be connected electrically.

Another deficiency of the prior art with respect to v-keyboards is that they often incorporate a fixed angle between the two blocks; however, a single, set angle is not optimum for all keyboard users. Consequently, many of these v-keyboards permit the angle to be adjusted, which is important because the angle of the v is a prime factor determining the comfort and useability of the keyboard.

While the benefits of adjusting a v-keyboard are significant, unfortunately the difficulty in finding the optimum v-angle is equally significant.

In fact, the process of finding the optimum v-angle is awkward and time-consuming. An initial v-angle must be selected, the keyboard must be secured at this angle (often the prior art used a nut or bolt to secure a given v-angle), and then the

keyboard must be used for a period of time. Once the keyboard user determined in which direction to change the v-angle, the process would have to be repeated. And when the direction could not be determined, the direction would have to be chosen by chance, which adds another step in the process. Eventually, after numerous v-angles had been tested, an optimum v-angle was located.

A further problem with these prior adjustable v-keyboards is that each time the v-angle of the keyboard was changed, this lengthy process had to be performed again. This would have occurred frequently, for example, when two keyboard users routinely shared one keyboard. Furthermore, it would occur even more frequently if the v-keyboard concept were to be applied to portable devices whose keyboards are designed to fold to enable compact storage and transport.

Therefore, one object of the invention is to provide a simplified, yet easy to use, hinged detent that is capable of connecting two halves of a v-keyboard and maintaining a v-angle.

Another object of the invention is to provide a low cost hinged detent that is easy to assemble.

Another object of the invention is to provide a hinged detent with ample room for the routing of wires, contacts, etc. through the hinge.

Yet another object of the invention is to provide a hinged detent that can be easily modified or removed at a manufacturing location should a product's requirements for a detent or a specific detent position change during a product's life cycle or across a product's family.

Another object is to provide a method to have v-keyboards, once set to an optimum v-angle, automatically open to the optimum v-angle.

Another object is to provide a method for a v-keyboard to "remember" the preferred v-angle.

Yet another object is to provide a method to be able to easily and conveniently set the optimum v-angle.

Yet another object is to provide a method to be able to easily and conveniently set the optimum v-angle without tools.

A further object is to provide a method for the keyboard user to be able to quickly relocate a preferred v-angle, even when another keyboard user has changed the stored v-angle, without going through a long process.

A still further object is to provide a method to set the v-angle with a dial, or visible tip, once the v-keyboard is in its desired operating position.

A general object is to provide an adjustable hinge detent usable in a variety of products.

The aforementioned deficiencies of the prior art are remedied by the above stated objects of the invention, which invention is described and explained fully below.

SUMMARY OF THE INVENTION

The above objects and others are achieved with a hinged detent that connects two pivoting portions of a product. The simplified hinged detent includes a detent instrument and recesses (such as notches and grooves) that provide a snap feel when the product halves are closed or opened to an operable angle. Furthermore, the hinged detent can have a plurality of factory-set operable angles. The detent can be easily assembled along the z-axis, and it provides room for the routing of wires, connectors, etc. during assembly. Additionally, the hinged detent lasts longer by manufacturing the detent instrument out of material that differs from the remainder

of the detent.

In adjustable embodiments, a dial or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves are to be opened. Locating elements are forcibly disengaged from one set of adjusting recesses in the adjustable hinge, then rotated to different adjusting recesses in the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses. This mechanism permits a multitude of operable angles to be selected. Each time the product portions are reopened, they can automatically open to the previously selected angle.

Returning to a preferred embodiment, a v-keyboard, it should further be noted that utilizing a v-keyboard at the optimum v-angle would be even more troubling for portable devices with keyboards that must fold for easier transport. Each time that a portable device was to be moved, the v-angle setting process would have to be performed again. Hence, such portable devices would virtually guarantee that the time-consuming process would have to be performed frequently. By enabling the v-keyboard to be automatically reopened to the previously set v-angle, the adjustable hinge detent of the current invention facilitates the utilization of v-keyboards in folding, portable devices.

In one adjustable embodiment, a detent instrument is trapped in a locating groove in the first of two product portions, e.g., one of two halves of a v-keyboard joined by an adjustable hinge detent of the current invention. It is also held in place by a recess in the second product portion. As the portions pivot with respect to one another, the detent instrument is forced out of the recess and carried along a track by the locating groove to a notch, the position of which is adjustable and determines the angle that the device is to be opened. The detent feel feature snaps the detent instrument into the notch and completes the opening process. The procedure for closing is merely the reverse of the opening process.

The hinged detent of the current invention, in both the adjustable and non-adjustable embodiments, is not useful only for keyboards. It can also be advantageously used to control, for example, the angle to which a laptop screen opens, the amount collapsible headphones unfold, or the angle a stand (for example, for a telephone) is tilted. It can additionally be used to provide a detent position and feel in, for example, cell phone flip doors, portable cassette player doors, and swivel antennas.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the method and apparatus of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

FIG. 1A illustrates a bottom view of an apparatus in the closed position according to a non-adjustable embodiment of the invention;

FIG. 1B illustrates a top view of an apparatus in the open position according to a non-adjustable embodiment of the invention;

FIG. 2A illustrates an exploded view from above of a first non-adjustable embodiment;

FIG. 2B illustrates an exploded view from below of a first non-adjustable embodiment;

FIG. 3A illustrates a view from below of the housing right of a second non-adjustable embodiment;

FIG. 3B illustrates a view from above of the housing left of a second non-adjustable embodiment;

FIG. 4A illustrates an apparatus in the open position according to a first adjustable embodiment of the invention;

FIG. 4B illustrates an apparatus in the closed position according to a first adjustable embodiment of the invention;

FIGS. 5A and 5B illustrate exploded views according to the first adjustable embodiment;

FIGS. 6A and 6B also illustrate exploded views according to the first adjustable embodiment;

FIGS. 7, 7A, and 7B show views of the first adjustable embodiment in the closed position;

FIGS. 8, 8A, and 8B show views of the first adjustable embodiment in an opening position;

FIGS. 9, 9A, and 9B show views of the first adjustable embodiment in an open position;

FIGS. 10, 10A, and 10B show views of the first adjustable embodiment;

FIGS. 11, 11A, and 12 show views of the first adjustable embodiment that relate to setting the v-angle;

FIGS. 13 and 14 illustrate an exploded view of the second adjustable embodiment of the invention;

FIGS. 15 and 16 illustrate an exploded view of the third adjustable embodiment of the invention;

FIG. 17 illustrates an exploded view of the fourth adjustable embodiment of the invention; and

FIG. 18 illustrates an exploded view of the fifth adjustable embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention and their advantages are best understood by referring to FIGS. 1A-18 of the drawings, like numerals being used for like and corresponding parts of the various drawings.

Referring to FIGS. 1A-3B, a non-adjustable hinged detent embodiment for two rotatable parts is illustrated. These diagrams of a non-adjustable implementation illuminate the details of the non-adjustable implementation and additionally provide a simplified foundation for understanding the adjustable implementation, which is described subsequently.

Referring to FIG. 1A, a non-adjustable (Non-adjustable in the sense that the operable angle cannot be adjusted in the ordinary course of operation; a subsequently-described, non-adjustable embodiment does permit the operable angle, or detent position, to be selected during assembly or whenever the detent is later disassembled. This subsequently-described embodiment also permits, in the alternative, a plurality of detent positions, i.e., two or more operable angles, to be rotated to and then snapped into. Neither alternative of this subsequently-described, non-adjustable embodiment includes an adjusting dial/detent adjustor, however.) hinge detent apparatus is illustrated from a bottom view in the closed position. Non-adjustable hinge 105 connects right-hand keyboard 140 and left-hand keyboard 130.

It should be noted that the incorporation of the non-adjustable hinge detent

apparatus into a keyboard is by way of example only. It can be used, for instance, to control the angle to which a laptop screen opens, the amount collapsible headphones unfold, or the angle a stand (for example, for a telephone) is tilted. It can additionally be used to provide a detent position and feel in, for example, cell phone flip doors, portable cassette player doors, and swivel antennas.

Referring to FIG. 1B, a keyboard is pictured from above in the open position. Capped hinge 105' connects left-hand keyboard 130 to right-hand keyboard 140, and capped hinge 105' holds them in an open detent position as illustrated. (In FIG. 1B, the keys are not pictured.)

It is important to note that other detent instruments, instead of a detent ball, can be used. For example, a detent cylinder can be used. Furthermore, other detent implements, beyond detent instruments (e.g., spring-operated detent balls and detent cylinders), can be used in the adjustable embodiments. A non-exclusive list of additional detent implements includes post-and-hole detents, detent dogs, detent catches, and camming surfaces and springs. It should be noted that detent balls and detent cylinders are often, but not always, spring-operated.

Referring now to FIGS. 2A and 2B, a first embodiment of the non-adjustable hinge detent apparatus is shown. Left-hand keyboard 130 preferably adjoins housing left 210. Housing left 210 supports hinge shaft 220 and defines ball recess 240. (Ball recess 240 is a term for this preferred embodiment. The recess can be for a cylinder; hence, cylinder recess is an alternative term. Furthermore, a general term is instrument mate. Instrument mate includes both recesses and bumps. Essentially, it includes any texture, convex surface, or concave surface that can help locating groove 230 contain the detent instrument. For instance, a cylindrical detent instrument with a concave bottom could mate with a convex bump instrument mate.) Locating groove 230 is also defined by housing left 210. Detent ball 215 is contained within locating groove 230 after assembly. Right-hand keyboard 140 preferably adjoins housing right 205. Housing right 205 includes ball groove 235 (generally termed a detent instrument groove) and detent hump 245. Detent groove 250 is defined by housing right 205. Furthermore, large pocket 260 is also defined by housing right 205 in conjunction with hinge shaft 220. Large pocket 260 effectively provides an area between hinge shaft 220 and the hinge walls for routing of wires, cables, connectors, etc. This routing ability is desired in many of today's new products and required in v-keyboards where the left and right halves must be connected electrically.

As shown by assembly axis (vertical) 225, the hinge apparatus can be assembled along the z-axis. Vertical assembly is preferred for high volume and automated manufacturing situations. Assembly can be accomplished by placing detent ball 215 into ball recess 240, lowering housing right 205 onto housing left 210 (trapping detent ball 215), and then pressing hinge fastener 255 over hinge shaft 220. Hinge fastener 255 holds the assembly together. It should be noted that other techniques to attach the two housings together can be used. One example is the inclusion of snaps on hinge shaft 220, which eliminates the need for a hinge fastener 255. Without hinge fastener 255, housing right 205 could include or be attached to a covering surface to contain wires, etc. in large pocket 260.

Continuing with FIGS. 2A and 2B, the hinge operates as follows. Detent ball 215 always remains in locating groove 230. Thus, it travels with housing left 210. By way of example, as right-hand keyboard 140 and therefore housing right 205 rotate about hinge shaft 220, detent ball 215 rides freely (not under stress) from the beginning to the end of ball groove 235. Detent ball 215 must squeeze past detent hump 245 by springing the plastic material out of the way. Detent ball 215 then snaps into detent groove 250. In this position, the detent mechanism is again not under stress and is then holding the housings open. An opposite motion can return the keyboard halves and housings to a closed position. Another detent hump and detent groove pair could be included at the beginning of ball groove 235 for a detent feel and effect at closing.

The detent hump area is preferably a plastic spring element with sufficient

stiffness to achieve the desired detent snap feel. The detent instrument, a ball as described above in a preferred embodiment, is preferably of a material different from the remainder of the hinge, e.g., dissimilar material to plastic. With proper construction, the combination of the plastic spring element with the dissimilar material of the detent instrument greatly reduces the wear on the detent hump. The device thus has a longer life cycle. Moreover, ball groove 235 enables there to be stress and friction in the system only at the point that detent ball 215 passes detent hump 245. This further reduces wear as compared to prior art designs.

Returning to an operational description, when detent ball 215 clicks into detent groove 250, the v-keyboard is in an open position. This corresponds to a single, non-adjustable operable angle of a non-adjustable hinge detent apparatus. It should be noted here that multiple non-adjustable operable angles can be implemented into the non-adjustable hinge detent apparatus. Multiple triplets of a detent hump/detent groove/detent hump nature can be placed along (a possibly elongated) ball groove 235. A keyboard user can then feel several clicks as the available operable angles are presented by rotating housing left 210 with respect to housing right 205.

Referring to FIGS. 3A and 3B, a second non-adjustable embodiment is illustrated. An embodiment that uses FIG. 3A and 3B together also has multiple operable angles. FIG. 3A illustrates a view from below of housing right, and FIG. 3B illustrates a view from above of housing left. FIG. 3A shows the locations of original ball groove 335, original detent hump 345, and original detent groove 350. On the opposite side of original detent groove 350 to original detent hump 345 is added detent hump 375. Beyond added detent hump 375 is added ball groove 365. FIG. 3B shows the locations of original locating groove 330, added locating grooves 360, and available detents 395. As pictured, original locating groove 330 corresponds to the fourth detent position available and the fourth detent instrument, preferably a ball in this embodiment.

As shown in FIG. 3B, multiple detent instruments, e.g., balls or cylinders, can be placed within original locating groove 330 and added locating grooves 360. If only one detent instrument is inserted, then only one detent position, or operable angle, is available. However, the availability of multiple locating grooves enables the manufacturer to select the desired detent position during assembly. Furthermore, the detent position can be changed by disassembling the hinge and placing the detent instrument in a different locating groove. In this context, the housing left of FIG. 3B can be used with the housing right of FIGS. 2A and 2B.

Alternatively, the housing left of FIG. 3B can be paired with the housing right of FIG. 3A. When paired with the housing right of FIG. 3A, a detent instrument can be inserted into multiple, indeed all, locating grooves to enable multiple detent positions to be able to be snapped into. After the hinge has been snapped into the first available detent position; the first detent ball can squeeze past added detent hump 375 and into added ball groove 365. The first detent ball travels in the first locating groove along added ball groove 365 until the second detent ball squeezes past original detent hump 345 and into original detent groove 350. This process can continue through the fourth available detent position, which corresponds to original locating groove 330.

These non-adjustable hinge detent designs provide several additional advantages over the prior art. The detent instrument can be removed entirely if a detent should no longer by needed in the hinge. Also, a slightly smaller detent instrument can be used if less detent force is desired, or a larger detent instrument can be used if more detent force is desired.

It is noted that reading and understanding the adjustable embodiments below will reveal to the artisan further details that can be incorporated into non-adjustable embodiments and will suggest possible modifications as well. Moreover, understanding the non-adjustable implementations will, conversely, illuminate aspects and possible modifications of the adjustable implementation.

Referring to FIG. 4A, an apparatus, which is preferably a v-angled keyboard, is

illustrated according to the first adjustable embodiment. While a keyboard is pictured, it should be remembered that this illustration is by way of example only and should not be taken to be limiting. The adjustable hinge detent assembly aspect of the present invention is equally usable in a variety of other devices. For example, it can be used to control the angle to which a laptop screen opens, the amount collapsible headphones unfold, or the angle a stand (for example, for a telephone) is tilted. Furthermore, it can additionally be used to provide a detent position and feel in, for example, cell phone flip doors, portable cassette player doors, and swivel antennas. Returning to FIG. 4A, the keyboard 400 is shown in an assembled view in open position. Now referring to FIG. 4B, the keyboard 400 is shown in an assembled view in closed position. In both FIGS. 4A and 4B, the LH keyboard 430 and the RH keyboard 440 are shown joined by an adjustable hinge 405.

Now referring to FIGS. 5A and 5B, the upper hinge area 505 and the lower hinge area 510 of the first adjustable embodiment are pictured. FIG. 5A additionally shows where upper hinge area 505 is connected to RH keyboard 440 and where lower hinge area 510 is connected to LH keyboard 430. Also, as in the non-adjustable hinge of FIGS. 1-3, the adjustable hinge of FIGS. 5A and 5B includes a detent ball 515 (pictured in 5B only). (Here again, as in all other embodiments of the current invention, it is important to note that other detent instruments, instead of a detent ball, can be used. For example, a detent cylinder can be used. Furthermore, other detent implements, beyond detent instruments (e.g., spring-operated detent balls and detent cylinders), can be used in the adjustable embodiments. A non-exclusive list of additional detent implements includes post-and-hole detents, detent dogs, detent catches, and camming surfaces and springs. It should be noted that detent balls and detent cylinders are often, but not always, spring-operated.)

Continuing with FIG. 5B only, the indication features of the invention are diagramed at 560. The indication features 560 indicate the range of available operable angles to which the adjustable hinge detent can be set. In a preferred adjustable embodiment, they can be, for example, (i) an array of radiating lines, (ii) an arc of numbers that represent the operable angles in degrees, or (iii) a combination of both. In operation, the v-keyboard can be set to a desired v-angle by pointing the arrow indicator 555 to the corresponding element in the indication features 560.

In this first adjustable embodiment, this is preferably accomplished by inserting a tool, e.g., a screwdriver, into slot 545, which is disposed on visible tip 550, and applying a downward force. The downward force applies pressure onto biasing spring 525 and permits the detent adjuster 520 to descend toward the bottom of lower hinge area 510. As will be explained more fully below, once descended, the detent adjuster 520 can be rotated into a new position, i.e., the arrow indicator 555 can be rotated toward a new element in the indication features 560. It should also be noted that while the detent adjustor is pictured here as preferably substantially circular, other shapes can be employed by an artisan without departing from the scope and spirit of the invention.

As is diagramed later (and termed in that context a dial), the visible tip as pictured at 550 can be slightly modified so that it can be rotated by hand. Such a modification would be within the ordinary skill of an artisan. Thus, visible tips can include dials, and vice versa.

The detent adjuster 520 also includes the visible tip 550, a raised section 535, and one or more locating pins 540. One or more clearances for snaps 570 are provided with detent adjuster 520 to provide clearance for one or more snap features 565, which are attached to lower hinge area 510. Finally, lower hinge area 510 also includes a locating groove 530, which is equivalent to a recess.

Now referring to FIGS. 6A and 6B, LH keyboard 430, RH keyboard 440, lower hinge area 510, and upper hinge area 505 are pictured from the opposite perspective. Biasing spring 525 is again shown to be disposed between lower hinge area 510 and detent adjuster 520. Likewise, clearance for snaps 570, visible tip 550, and detent ball 515 are illustrated again.

FIG. 6B also shows notch 605 with detent adjuster 520 and recess 615 with upper hinge area 505. The adjusting recesses 610 in upper hinge area 505 are designed to mate with locating pins 540. It can now be seen that once the detent adjuster 520 has been sufficiently depressed (depressed meaning that it approaches lower hinge area 510), then the locating pins 540 will descend below adjusting recesses 610. Once the locating pins 540 are freed from adjusting recesses 610, detent adjuster 520 can be rotated by the visible tip 550. Once arrow indicator 555 has been rotated to the desired element (desired because it is known that the element corresponds to the most comfortable v-angle or desired because it is the next element to try for determining the most comfortable v-angle) in the indication features 560, pressure on detent adjustor 520 is released, and detent adjustor 520 ascends toward upper hinge area 505 because of the force from biasing spring 525.

Essentially simultaneously, locating pins 540 ascend and enter adjusting recesses 610 in recesses that differ from those that were occupied before detent adjustor 520 was rotated. Once the adjustable hinge is set in this fashion, the v-keyboard can be closed. Upon opening the keyboard, it will automatically open to the most-recently-set v-angle, as determined by which recesses of the adjusting recesses 610 the locating pins 540 are in and as indicated by the arrow indicator 555 in conjunction with the indication features 560. Thus the setting process (or resetting process) is complete.

The currently-set v-angle is the current operable angle. Thus, the operable angle changes based on the setting of the adjustable hinge detent, as can be determined by indication features in conjunction with an arrow indicator. Moreover, a plurality of operable angles can be made available to the user if so warranted. For instance, if the adjustable hinge detent is incorporated into a stand that frequently would be useful at two different set, or operable, angles, then a preferred adjustable embodiment can be modified by incorporating a plurality of notches 605 into the detent adjustor 520 along with a plurality of arrow indicators 555.

In summary as to this point, one purpose of the adjustable hinge detent is to provide a user with the ability to set a preferred v-angle of an opened v-keyboard, and then the v-keyboard "remembers" the preferred v-angle until the user decides to change it. The first adjustable embodiment, which is presently a preferred adjustable embodiment, is further illustrated in FIGS. 7-12.

Referring to FIGS. 7, 7A, and 7B, cross-sectional views of the keyboard at the closed position are shown. In this position, the detent ball 515 is biased into a recess 615 in the upper hinge area 505 of the RH keyboard 440 by the detent adjustor 520 and the biasing spring 525. In addition, the detent ball 515 is maintained within the locating groove 530 in the lower hinge area 510 of the LH keyboard 430. Note that the detent adjustor 520 has a raised section 535 to further maintain the detent ball 515 in the locating groove 530.

As the keyboard halves are separated or opened about the hinge pivot point, the detent ball 515 is forced downward to react against the biasing spring 525 and detent adjuster 520, as the recess 615 in the upper hinge area 505 of the RH keyboard 440 is rotated out of position.

Referring to FIGS. 8, 8A, and 8B, cross-sectional views of the keyboard in an opening position are shown. In this position, the keyboard halves are at some point between the fully closed position and the desired open position (preferred v-angle). Again, the detent ball 515 is maintained in the same angular location with respect to the LH keyboard 430 by the locating groove 530 in the lower hinge area 510 of the LH keyboard 430 and the raised section 535 of the detent adjustor 520.

Referring now to FIGS. 9, 9A, and 9B, cross-sectional views of the keyboard in a desired open position are shown. As the keyboard halves have reached the desired open position, the notch 605 in the detent adjustor 520 becomes aligned with the position of the detent ball 515 (and subsequently with the locating groove 530 in the RH keyboard 440). As shown in FIG. 9A, the biasing spring 525 forces the detent

adjustor 520 to trap the detent ball 515 within the notch 605 in the detent adjustor 520, giving the detent or locating feel to the user to indicate that the halves are in the desired v-angle position.

When the keyboard halves are moved back to the closed position, the hinge functions in an identical but reversed mode.

As explained above, the locating groove 530 in the lower hinge area 510 of the LH keyboard 430 maintains the detent ball 515 with respect to the LH keyboard 430 angular position. Now consider the features that maintain the detent adjustor 520 to the RH keyboard 440.

The sectional views in FIGS. 10, 10A, and 10B illustrate how the detent adjustor 520 is maintained against the RH keyboard 440. Preferably, two locating pins 540, which form a part of the detent adjustor 520, extend outward into mating adjusting recesses 610 in the upper hinge area 505 of the RH keyboard 440. These locating pins 540 maintain the detent adjustor 520 in the desired angular location to the RH keyboard 440 regardless of the motion of the RH keyboard 440.

It is important that the length of the locating pins 540 be sufficient to maintain this interaction even as the detent adjustor 520 is forced down (away from the upper hinge area 505 of the RH keyboard 440) by the detent ball 515 as the keyboard halves transition from fully closed to the desired open position, or vice versa. It should be noted that locating pins 540 are not the only implementation within the scope of the present invention. They could be replaced, for instance, by ribs, ridges, or any other type of means that ensures the detent adjustor 520 is maintained with respect to the RH keyboard 440. Another possible type of means is friction. Sufficient friction can be developed, for instance, by using a biasing spring 525 with a strong constant, by employing different materials such as rubber to gain a larger coefficient of friction, or by some combination thereof. Other possible frictional implementations, including the substitution of other high-friction materials, will become apparent to the artisan after reading and understanding the principles of the invention.

Referring to FIGS. 11, 11A, and 12, these views illuminate the adjusting process that allows the user to set the desired open position detent. Again, taken in the closed position, the user would insert a screw driver or other such device into slot 545, or equivalent feature, provided on the visible tip 550 of the detent adjustor 520. By applying pressure to the visible tip 550 in the downward direction, the detent adjustor 520 is forced down, which compresses the biasing spring 525. It is important that the spring deflection and distance between the bottom of the detent adjustor 520 and the lower hinge area 510 of the LH keyboard 430 be sufficient to allow the detent adjustor 520 to travel downward enough to fully separate the locating pins 540 on the detent adjustor 520 from the adjusting recesses 610 in the upper hinge area 505 of the RH keyboard 440.

The detent adjustor 520 can then be rotated (e.g., by way of turning the screw driver or other equipment) until the desired angular location is achieved. The arrow indicator 555 feature on the visible tip 550 of the detent adjustor 520 aligns with similar indication features 560 visible to the user on the RH keyboard to indicate at what open setting the detent is located. When pressure is removed from the visible tip 550, the biasing spring 525 once again forces the detent adjustor 520 upward, trapping the detent ball 515. Again the locating pins 540 maintain this new open detent position with respect to the RH keyboard.

Referring now to FIG. 13, a second adjustable embodiment of the invention is illustrated. This second adjustable embodiment includes modifications to the first adjustable embodiment. The recess 615 is denoted in the underside of upper hinge area 505 where it is located, but hidden from view in FIG. 13. Locating ribs 1310 are preferably substantially perpendicular to the plane of detent adjustor 520. The locating ribs 1310 are substituted for the locating pins 540 of the first adjustable embodiment. Correspondingly, the adjusting recesses 610 of the first adjustable embodiment are replaced by slotted adjusting recesses 1320 to properly accommodate

locating ribs 1310.

Numerous conditions should be noted. First, the rib height is preferably greater than the detent ball 515's diameter to ensure that detent adjustor 520 rotates with RH keyboard 440. Second, the number of ribs and their orientation preferably dictate the options and proportionality of the possible detent angles. Third, many other locating elements, beyond pins, ribs, and ridges, can be used in the adjustable hinge detent of the present invention. Fourth and finally, it is noted that biasing spring 525 preferably allows the detent adjustor 520 to descend more than the rib height to allow for adjusting the detent angle.

Turning now to FIG. 14, a modification of both the first and second adjustable embodiments is illustrated. The prior biasing spring 525 can, instead of being a separate element, be incorporated into the detent adjustor 520 or another element such as either upper hinge area 505 or lower hinge area 510. Biasing spring 1410 is pictured incorporated into modified detent adjustor 1420. While stamped spring fingers comprise biasing spring 1410, other spring structures can also be utilized.

Referring now to FIG. 15, the third adjustable embodiment is illustrated. The detent adjustor 520 has been replaced with dial 1510 and detent plate 1520. Each is displaced between upper hinge area 505 and biasing spring 525 and maintained in position with snap features 565, which hold LH keyboard 430 and RH keyboard 440 together. Dial 1510 includes a downward extending dial key 1530 which mates with the keymate 1540 in detent plate 1520. Rotating dial 1510 then rotates detent plate 1520 and thus detent plate ball recess 1550. This third adjustable embodiment also illustrates another locating element. This adjustable embodiment includes first rough surface 1560 on dial 1510 and second rough surface 1570 on the underside of upper hinge area 505; the second rough surface 1570 accommodates, or mates, with the first rough surface 1560. In the third adjustable embodiment, the detent ball 515 travels in a circular path until it reaches the detent plate ball recess 1550, which provides the detent feel as the ball catches in the recess. Rotating dial 1510, through dial key 1530 and keymate 1540, rotates the detent plate ball recess 1550. This interaction permits the detent angle, a v-angle in the preferred keyboard adjustable embodiment, to be set and later changed. It should be noted that dial 1510's diameter is preferably less than the area the ball will travel such that the ball can mate with recess 615 on the underside of upper hinge area 505.

Turning now to FIG. 16, it is illustrated how biasing spring 525 can be incorporated into detent plate 1520. Incorporated biasing spring 1610 is also shown with spring fingers, and here, too, other spring structures can be utilized instead.

Referring to FIG. 17, the fourth adjustable embodiment is illustrated. This adjustable embodiment is preferably interconnected by assembly screw 1705, which is received by threaded hole 1710, located in lower hinge area 510. Other assembly techniques can be used; for instance, it can be pinned, riveted, etc. Beneath assembly screw 1705 is hand-rotatable dial 1720, which passes through upper hinge area 505. Hand-rotatable dial 1720 is used to control the detent angle, preferably a v-angle of a v-keyboard.

Hand-rotatable dial 1720 also includes an indicator notch 1715 disposed on its upper surface, and upper hinge area 505 also includes angle indication features 1730. As was diagramed above (and termed in that context a visible tip), the hand-rotatable dial as pictured at 1720 can be slightly modified so that it can be operated with tools, e.g., a screwdriver. Such a modification is within the ordinary skill of an artisan. Thus, dials can include visible tips, and vice versa.

Disposed between upper hinge area 505 and lower hinge area 510 are first biasing spring 1740, first detent plate 1750, second detent plate 1765, and second biasing spring 1780. Hand-rotatable dial key 1725 is designed to mate with second keymate 1770, which is provided in second detent plate 1765. Upper hinge area key 1735 is designed to mate with first keymate 1760, which is provided in first detent plate 1750.

The fourth adjustable embodiment further includes the following elements. First, detent ball 1755 rests in ball-trapping recess 1785, which is located in lower hinge area 510. Second, first detent plate 1750 includes first detent plate ball recess 1745, and second detent plate 1765 includes second detent plate ball recess 1775.

It is noted that hand-rotatable dial 1720, hand-rotatable dial key 1725, and therefore second detent plate 1765 are frictionally held in place when not intentionally being rotated. Alternatively, notches, teeth, etc. can be elements employed to ensure that the parts maintain their location relative to the hinged parts 430 (LH keyboard) and 440 (RH keyboard).

Continuing with the operational explanation, detent ball 1755 preferably remains within ball-trapping recess 1785, also termed a locating groove above, throughout the hinging movement. In a closed position, detent ball 1755's position is maintained with a snap feel by first detent plate ball recess 1745. As hinged parts 430 and 440 begin to open, first biasing spring 1740 is depressed as detent ball 1755 snaps out of first detent plate ball recess 1745 and begins to travel in a circular path, propelled by ball-trapping recess 1785. When detent ball 1755 reaches second detent plate ball recess 1775, second biasing spring 1780 is expanded and contracted and detent ball 1775 snaps into second detent plate ball recess 1775.

Therefore, changing the operable angle of the keyboard is achieved by rotating the hand-rotatable dial 1720 and hence operationally connected second detent plate 1765. It should be noted that incorporating first and second biasing springs 1740 and 1780 into one or more detent plates is equally within the scope of the invention for this fourth adjustable embodiment, but is not specifically illustrated.

Referring to FIG. 18, the fifth adjustable embodiment is illustrated. The fifth adjustable embodiment is similar to the fourth adjustable embodiment in both design and operation. Upper hinge area key 1735, first biasing spring 1740, and first detent plate 1750 are removed. A recess 1820 is then provided in upper hinge area 505 to accommodate detent ball 1755 in the closed position. Un-keyed element 1810 serves to reinforce the absence of upper hinge area key 1735.

Hand-rotatable dial key 1725 mates with keymate 1840, which is provided in detent plate 1830. Again, a biasing spring 1860 provides an upward force against detent plate 1830. When detent ball 1755 reaches the detent plate ball recess 1850, the user receives a snap feel to communicate that the two keyboard parts 430 and 440 have reached the set detent v-angle. It is noted here again that biasing spring 1860 can be incorporated into another element of the hinge; for example, detent plate 1830, lower hinge area 510, or upper hinge area 505 can include an incorporated spring.

Although preferred embodiments of the method and apparatus of the present invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the spirit of the invention as set forth and defined by the following claims. For example, the adjustable hinge detent can be utilized in collapsing headphones, folding laptop computer screens, tiltable mechanical stands for various devices, etc.

#Claims:

ATTENTION - DATA WAS TAKEN FROM US6195839

What is claimed is:

1. A hinged electronic apparatus, comprising:

a first hinged portion, said first hinged portion including at least one key;

a second hinged portion, said second hinged portion including at least one key;

a hinge portion, said hinge portion enabling said first hinged portion to rotate with respect to said second hinged portion;

a detent operatively connected to said hinge portion, said detent including a plurality of detent positions, said detent thereby capable of establishing a plurality of predetermined positions; and

wherein said detent includes a detent adjustor, said detent adjustor rotatable to set an individual position from said plurality of predetermined positions, said detent adjustor capable of being operably rotated while said first hinged portion is in an approximately fixed relationship with said second hinged portion.

2. The hinged electronic apparatus of claim 1, wherein:
said first and second hinged portions form at least part of a keyboard.

3. The hinged electronic apparatus of claim 1, wherein:
said detent adjustor includes a notch at a periphery of said detent adjustor, and said detent adjustor further includes means for adjusting said notch angularly and for fixing said notch at varying angular distances from a detent instrument held by at least one of a locating groove and a recess.

4. The hinged electronic apparatus of claim 1, wherein:
said detent adjustor further includes at least one locating element.

5. The hinged electronic apparatus of claim 1, wherein:
said first hinged portion further includes an associated first hinged area;
said second hinged portion further includes an associated second hinged area; and
said detent further includes a spring that biases said detent adjustor and a detent instrument for establishing, at least partially, said individual position from said plurality of predetermined positions.

6. The hinged electronic apparatus of claim 5, wherein:
said spring is integral with said detent adjustor.

7. The hinged electronic apparatus of claim 5, wherein:
said first hinged area, which is associated with said first hinged portion, includes at least one indication feature on a side facing away from said second hinged area.

8. A method for operating an adjustable hinge of an electronic apparatus, the electronic apparatus having a first hinged portion that includes at least one key, a second hinged portion that includes at least one key, and a detent, said detent operatively connected to said first and second hinged portions therebetween and including a detent adjustor, the method comprising:
rotating said first hinged portion with respect to said second hinged portion to a first predetermined angle measurable between said first hinged portion and said second hinged portion;
adjusting said detent adjustor, said detent adjustor adjustable from a first position establishing said first predetermined angle to a second position establishing a second predetermined angle by, at least in part, rotating said detent adjustor while said first hinged portion remains in an approximately constant angular relationship with said second hinged portion; and
rotating said first hinged portion with respect to said second hinged portion to said second predetermined angle measurable between said first hinged portion and said second hinged portion.

9. The method for operating an adjustable hinge of claim 8, further comprising the step of:
ascertaining a preferred angle measurable between said first hinged portion and said second hinged portion.

10. The method for operating an adjustable hinge of claim 9, wherein:
said step of adjusting said detent adjustor further includes the step of setting said detent adjustor to a preferred position establishing said preferred angle.

11. The method for operating an adjustable hinge of claim 10, wherein:
said preferred angle coincides with said second predetermined angle and said preferred position coincides with said second position.

12. The method for operating an adjustable hinge of claim 8, wherein:

said first and second hinged portions form at least part of a keyboard and said steps of rotating further comprise the steps of rotating said at least part of a keyboard in a plane defined by said at least part of a keyboard.

13. An electronic device having an adjustable hinge, comprising:
a first hinged portion, said first hinged portion including at least one key;
a second hinged portion, said second hinged portion including at least one key;
a hinge portion, said hinge portion enabling said first hinged portion to rotate with respect to said second hinged portion; and
detent means in operative association with said first and second hinged portions and said hinge portion for setting at least one operable angle from between or among a plurality of possible operable angles between said first and second hinged portions, said detent means including at least one substantially disc-shaped component, said at least one substantially disc-shaped component adapted for operational rotation while said first hinged portion does not rotate with respect to said second hinged portion.

14. The electronic device having an adjustable hinge of claim 13, wherein:
said detent means further includes a detent implement for snapping into a notch of said at least one substantially disc-shaped component.

15. An electronic device having an adjustable hinge, comprising:
a first hinged portion, said first hinged portion including at least one key;
a second hinged portion, said second hinged portion including at least one key;
a hinge portion, said hinge portion enabling said first hinged portion to rotate with respect to said second hinged portion;
detent means in operative association with said first and second hinged portions and said hinge portion for setting at least one operable angle from between or among a plurality of possible operable angles between said first and second hinged portions, said detent means including at least one substantially disc-shaped component; and
wherein:
said at least one substantially disc-shaped component comprises a detent adjustor; and
said detent means is disposed between said first and second hinged portions and further includes
a detent instrument and
a spring, said spring biasing said detent adjustor.

16. The electronic device having an adjustable hinge of claim 15, wherein:
said detent adjustor further includes at least one locating element attached to said detent adjustor; and
a visible tip attached to said detent adjustor.

17. The electronic device having an adjustable hinge of claim 16, further comprising:
a first hinged area connected to said first hinged portion, said first hinged area including at least one indication feature;
a second hinged area connected to said second hinged portion, said second hinged area including at least one snap feature; and
at least one recess for said detent instrument on any of said first hinged area, said second hinged area, or said detent adjustor.

18. The electronic device having an adjustable hinge of claim 15, wherein:
said first and second hinged portions form at least part of a keyboard.

19. An electronic device having an adjustable hinge, comprising:
a first hinged portion, said first hinged portion including at least one key;
a second hinged portion, said second hinged portion including at least one key;
a hinge portion, said hinge portion enabling said first hinged portion to rotate with respect to said second hinged portion;
detent means in operative association with said first and second hinged portions and said hinge portion for setting at least one operable angle from between or among

a plurality of possible operable angles between said first and second hinged portions, said detent means including at least one substantially disc-shaped component; and
wherein:
said at least one substantially disc-shaped component comprises a detent plate; and

said detent means further includes
a dial,
a key for engaging said detent plate, said key extending from said dial, and
a spring, said spring biasing said detent plate.

20. The electronic device having an adjustable hinge of claim 19, wherein:
said spring is incorporated into said detent plate.

21. The electronic device having an adjustable hinge of claim 19, wherein:
said dial is capable of being adjusted by hand.

22. An electronic device having an adjustable hinge, comprising:
a first hinged portion, said first hinged portion including at least one key;
a second hinged portion, said second hinged portion including at least one key;
a hinge portion, said hinge portion enabling said first hinged portion to rotate with respect to said second hinged portion;
detent means in operative association with said first and second hinged portions and said hinge portion for setting at least one operable angle from between or among a plurality of possible operable angles between said first and second hinged portions, said detent means including at least one substantially disc-shaped component; and
wherein:
said at least one substantially disc-shaped component comprises a first detent plate; and
said detent means further includes
a dial,
a second detent plate,
a first key for engaging said first detent plate,
a second key for engaging said second detent plate, and
first and second springs for biasing said detent means.

23. An electronic device having a hinge with an adjustable detent mechanism for providing snap-feedback to a user, the hinge comprising:
a first portion, said first portion including a locating groove and at least one key;
a second portion, said second portion including at least one first mating structure and at least one key;
a hinge portion, at least part of said hinge portion disposed between said first and second portions, said hinge portion enabling said first portion to rotate with respect to said second portion;
a detent adjustor, at least part of said detent adjustor disposed between said first and second portions, said detent adjustor including at least one notch and at least one second mating structure in operative alignment with said at least one first mating structure;
a detent instrument shaped to fit within said locating groove; and
wherein said first and second portions are rotatably connected via said hinge portion, and said at least one first mating structure and said at least one second mating structure are adjustably engaged so as to hold said detent adjustor in a constant angular position with respect to said second portion.

24. The electronic device of claim 23, wherein said at least one first mating structure comprises at least one adjusting recess and said at least one second mating structure comprises at least one locating pin.

25. The electronic device of claim 23, wherein said at least one first mating structure and said at least one second mating structure comprise friction-inducing surfaces.

26. The electronic device of claim 23, wherein said at least one first mating structure and said at least one second mating structure comprise ridges.

27. An electronic device having a hinge with an adjustable detent mechanism for providing snap-feedback to a user, the hinge comprising:
a first portion, said first portion including a locating groove and at least one key;
a second portion, said second portion including at least one first mating structure and at least one key;
a hinge portion, at least part of said hinge portion disposed between said first and second portions, said hinge portion enabling said first portion to rotate with respect to said second portion;
a detent adjustor, at least part of said detent adjustor disposed between said first and second portions, said detent adjustor including at least one notch and at least one second mating structure in operative alignment with said at least one first mating structure;
a detent instrument shaped to fit within said locating groove;
wherein said first and second portions are rotatably connected via said hinge portion, and said at least one first mating structure and said at least one second mating structure are adjustable engaged so as to hold said detent adjustor in a constant angular position with respect to said second portion; and
wherein the hinge further comprises a spring to bias said detent adjustor against said second portion, said spring permitting said detent adjustor to be depressed away from said second portion and rotated with respect thereto to thereby establish a different angular position with respect to said second portion.

28. An electronic device having an adjustably hinged keyboard, comprising:
a first portion of a keyboard;
a second portion of said keyboard;
a hinge, at least part of said hinge disposed between said first and second portions of said keyboard, said hinge rotatably connecting said first and second portions and thereby enabling said first portion to rotate with respect to said second portion to a first predetermined position; and
a detent adjustor, at least part of said detent adjustor disposed between said first and second portions of said keyboard, said detent adjustor establishing said first predetermined position from between or among a plurality of predetermined positions, said detent adjustor adapted for establishing a second predetermined position from between or among said plurality of predetermined positions by operably rotating said detent adjustor while said first portion of said keyboard remains in an approximately constant angular position with respect to said second portion of said keyboard.

29. The electronic device of claim 28, wherein said detent adjustor is capable of operable rotation while being pushed or pulled out of a neutral position, said neutral position being alterably maintained by a biasing mechanism.

30. The electronic device of claim 29, wherein said biasing mechanism comprises at least one mating structure.

31. The electronic device of claim 30, wherein said at least one mating structure comprises at least one of (i) at least one adjusting recess, (ii) at least one locating pin, (iii) at least one friction-inducing surface, and (iv) a plurality of ridges.

32. The electronic device of claim 29, wherein said biasing mechanism comprises a spring.
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BR9811447A;2000-08-22;Hinged detent
CN1113147CC;2003-07-02;Electronic device and method for regulating hinged positioning
CN1278887A;2001-01-03;Electronic device and method for regulating hinged positioning

EE200000121A;2000-12-15;Hinged detent
ES2189614A1;2003-07-01;Hinged detent
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GB0004438DD0;2000-04-12;Hinged detent
GB2347459A;2000-09-06;Hinged detent
GB2347459B;2001-12-05;Hinged detent
HK1033348A1;2004-02-06;A METHOD AND APPARATUS FOR AN ADJUSTABLE HINGED DETENT FOR ELECTRONIC APPARATUS
SE0000755A;2000-05-08;Hinged detent
SE0000755DD0;2000-03-07;Hinged detent
US6195839B1;2001-03-06;Hinged detent
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    Applicant="ERICSSON GE MOBILE INC" (B711EP)
    Inventor="PATTERSON GREGORY S" (B721EP)
    Inventor="SNYDER THOMAS D" (B721EP)

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OT="Aparelho articulado, processo para operação de uma articulação ajustável, articulação ajustável, e, articulação para dispositivos eletrônicos"
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S" (B721EP)
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TI="Electronic device and method for regulating hinged positioning"
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Inventor="SNYDER T D (US)" (B721EP)

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Inventor="GREGORY S PATTERSON (US)" (B721EP)
Inventor="THOMAS D SNYDER (US)" (B721EP)

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Filed DATE="1998-09-04" PN="ES20000050018" (B211EP)
DATE="1997-09-09" PN="US19970926146" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D11/10; G06F3/02"
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AI="E05D11/10; G06F3/02"
OT="FIADOR ABISAGRADO."
OT="null"
OT="APARATO ELECTRONICO ABISAGRADO Y METODO DE FUNCIONAMIENTO CORRESPONDIENTE."
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S (US)" (B721EP)
Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="ES2189614B1" PD="2004-11-16" AP="ES200050018A" PN_E="ES2189614"
Legal Status: CODE="EC2A" DESC="SEARCH REPORT PUBLISHED" INFL="+"
DATE_MIGR="0001-01-01"
"ES200050018A 2003-07-01EC2A +SEARCH REPORT PUBLISHED Date of Ref Document 20030701"
"ES200050018A 2003-07-01EC2A +SEARCH REPORT PUBLISHED Kind Code of Ref Document A1"
Country Code="ES"
Filing / Published Document="F"
Document Number="200050018"
Kind Code="A"
IPR Type="PI"
PRS DOCUMENT TYPE="AN"
Gazette DATE="2003-07-01"
Legal Event Code 1="EC2A"
DATE last exchanged="2003-07-31"
DATE first created="2003-07-17"
Date of Ref Document="20030701"
Kind Code of Ref Document="A1"
Legal Status: CODE="FG2A" DESC="DEFINITIVE PROTECTION" INFL=""
DATE_MIGR="0001-01-01"
"ES200050018A 2004-11-16FG2A DEFINITIVE PROTECTION Ref Document Number 2189614B1"
"ES200050018A 2004-11-16FG2A DEFINITIVE PROTECTION Country of Ref Document ES"
Country Code="ES"
Filing / Published Document="F"
Document Number="200050018"
Kind Code="A"
IPR Type="PI"
PRS DOCUMENT TYPE="AN"
Gazette DATE="2004-11-16"
Legal Event Code 1="FG2A"
DATE last exchanged="2005-02-24"
DATE first created="2005-02-21"
Ref Document Number="2189614B1"
Country of Ref Document="ES"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2003-07-01" PN="ES2189614" (B111EP)
Filed DATE="1998-09-04" PN="ES20000050018" (B211EP)
DATE="1997-09-09" PN="US19970926146" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D11/10; G06F3/02"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
OT="FIADOR ABISAGRADO."
OT="null"
OT="APARATO ELECTRONICO ABISAGRADO Y METODO DE FUNCIONAMIENTO CORRESPONDIENTE."
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S (US)" (B721EP)
Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="GB0004438D0" PD="2000-04-12" AP="GB0004438A" PN_E="GB0004438D"
Priority: PRIO="US9818370W" DATE="1998-09-04"
Priority: PRIO="US92614697A" DATE="1997-09-09"

Family Member: PN="GB2347459A" PD="2000-09-06" AP="GB0004438A" PN_E="GB2347459"
Priority: PRIO="US9818370W" DATE="1998-09-04"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2000-09-06" PN="GB2347459" (B111EP)
Filed DATE="1998-09-04" PN="GB20000004438" (B211EP)
DATE="19970909;" PN="US19970926146" (B311EP)
DATE="1998-09-04" PN="WO1998US18370" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="G06F3/02; E05D11/10"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
TI="Hinged detent"
="Two pivoting portions (430, 440) of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial (520) or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements (540) are forcibly disengaged from one set of adjusting recesses (610) in the adjustable hinge, then rotated to different adjusting recesses (610) of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses." (B570EP)
="This mechanism permits a multitude of operable angles to be selected. Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to collect two v-keyboard halves a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand." (B570EP)
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S (US)" (B721EP)
Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="GB2347459B" PD="2001-12-05" AP="GB0004438A" PN_E="GB2347459"
Priority: PRIO="US9818370W" DATE="1998-09-04"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2000-09-06" PN="GB2347459" (B111EP)
Filed DATE="1998-09-04" PN="GB20000004438" (B211EP)
DATE="19970909;" PN="US19970926146" (B311EP)
DATE="1998-09-04" PN="WO1998US18370" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="G06F3/02; E05D11/10"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
TI="Hinged detent"
="Two pivoting portions (430, 440) of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial (520) or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements (540) are forcibly disengaged from one set of adjusting recesses (610) in the adjustable hinge, then rotated to different adjusting recesses (610) of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses." (B570EP)
="This mechanism permits a multitude of operable angles to be selected. Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to

collect two v-keyboard halves a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand." (B570EP)
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S (US)" (B721EP)
Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="HK1033348A1" PD="2004-02-06" AP="HK01104059A" PN_E="HK1033348"
Legal Status: CODE="PF" DESC="PATENT IN FORCE" INFL="+" DATE_MIGR="0001-01-01"
"HK01104059A 2004-12-15PF +PATENT IN FORCE"
Country Code="HK"
Filing / Published Document="F"
Document Number="01104059"
Kind Code="A"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="2004-12-15"
Legal Event Code 1="PF"
DATE last exchanged="2005-06-23"
DATE first created="2005-06-21"
Priority: PRIO="US9818370W" DATE="1998-09-04"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2004-02-06" PN="HK1033348" (B111EP)
Filed DATE="2001-06-13" PN="HK20010104059" (B211EP)
DATE="19980904;" PN="WO1998US18370" (B311EP)
DATE="1997-09-09" PN="US19970926146" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D; G06F"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
TI="A METHOD AND APPARATUS FOR AN ADJUSTABLE HINGED DETENT FOR ELECTRONIC APPARATUS"
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S" (B721EP)
Inventor="SNYDER THOMAS D" (B721EP)

Family Member: PN="SE0000755A" PD="2000-05-08" AP="SE0000755D" PN_E="SE0000755"
Legal Status: CODE="NAV" DESC="PATENT APPLICATION HAS LAPSED" INFL="-" DATE_MIGR="0001-01-01"
"SE0000755D 2003-12-16NAV -PATENT APPLICATION HAS LAPSED"
Country Code="SE"
Filing / Published Document="F"
Document Number="0000755"
Kind Code="D"
IPR Type="PI"
PRS DOCUMENT TYPE="A"
Gazette DATE="2003-12-16"
Legal Event Code 1="NAV"
DATE last exchanged="2004-02-05"
DATE first created="2004-02-03"
Priority: PRIO="US9818370W" DATE="1998-09-04"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2000-05-08" PN="SE0000755" (B111EP)
Filed DATE="2000-03-07" PN="SE20000000755D" (B211EP)
DATE="19970909;" PN="US19970926146" (B311EP)
DATE="1998-09-04" PN="WO1998US18370" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D11/10; G05F3/02"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
OT="Gångjärnsförsett spärrelement"
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSSON GREGORY S" (B721EP)
Inventor="SNYDER THOMAS D" (B721EP)

Family Member: PN="SE0000755D0" PD="2000-03-07" AP="SE0000755D" PN_E="SE0000755D"
  Legal Status: CODE="NAV" DESC="PATENT APPLICATION HAS LAPSED" INFL="-"
DATE_MIGR="0001-01-01"
    "SE0000755D 2003-12-16NAV   -PATENT APPLICATION HAS LAPSED"
    Country Code="SE"
    Filing / Published Document="F"
    Document Number="0000755"
    Kind Code="D"
    IPR Type="PI"
    PRS DOCUMENT TYPE="A"
    Gazette DATE="2003-12-16"
    Legal Event Code 1="NAV"
    DATE last exchanged="2004-02-05"
    DATE first created="2004-02-03"
  Priority: PRIO="US9818370W" DATE="1998-09-04"
  Priority: PRIO="US92614697A" DATE="1997-09-09"

Family Member: PN="US6195839B1" PD="2001-03-06" AP="US92614697A" PN_E="US6195839"
  Priority: PRIO="US92614697A" DATE="1997-09-09"
    Published DATE="2001-03-06" PN="US6195839" (B111EP)
    Filed DATE="1997-09-09" PN="US19970926146" (B211EP)
    DATE="1997-09-09" PN="US19970926146" (B311EP)
    EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
    IPC="B41J50/10"
    CI="E05D11/00; G06F3/02"
    AI="E05D11/10; G06F3/02"
    TI="Hinged detent"
    ="Two pivoting portions of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements are forcibly disengaged from one set of adjusting recesses in the adjustable hinge, then rotated to different adjusting recesses of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses. This mechanism permits a multitude of operable angles to be selected." (B570EP)
    ="Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to connect two v-keyboard halves, a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand." (B570EP)
    Applicant="ERICSSON INC (US)" (B711EP)
    Inventor="PATTERSON GREGORY S (US)" (B721EP)
    Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="US2001032375A1" PD="2001-10-25" AP="US75736501A"
PN_E="US2001032375"
  Priority: PRIO="US75736501A" DATE="2001-01-08"
  Priority: PRIO="US92614697A" DATE="1997-09-09"
    Published DATE="2001-10-25" PN="US2001032375" (B111EP)
    Filed DATE="2001-01-08" PN="US20010757365" (B211EP)
    DATE="20010108;" PN="US20010757365" (B311EP)
    DATE="1997-09-09" PN="US19970926146" (B311EP)
    EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
    IPC="E05D11/10"
    CI="E05D11/00; G06F3/02"
    AI="E05D11/10; G06F3/02"
    TI="Hinged detent"
    ="Two pivoting portions of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within

the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements are forcibly disengaged from one set of adjusting recesses in the adjustable hinge, then rotated to different adjusting recesses of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses. This mechanism permits a multitude of operable angles to be selected." (B570EP)
="Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to connect two v-keyboard halves, a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand." (B570EP)
Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S (US)" (B721EP)
Inventor="SNYDER THOMAS D (US)" (B721EP)

Family Member: PN="WO9913190A1" PD="1999-03-18" AP="US9818370W" PN_E="WO9913190"
Legal Status: CODE="AK" DESC="DESIGNATED STATES" INFL="+" DATE_MIGR="0001-01-01"
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Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="1999-03-18"
Legal Event Code 1="AK"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-27"
Kind Code of Ref Document="A1"
Designated State(s)="AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW"
Legal Status: CODE="AL" DESC="DESIGNATED COUNTRIES FOR REGIONAL PATENTS" INFL="+" DATE_MIGR="0001-01-01"
"WO9818370W 1999-03-18AL +DESIGNATED COUNTRIES FOR REGIONAL PATENTS Kind Code of Ref Document A1"
"WO9818370W 1999-03-18AL +DESIGNATED COUNTRIES FOR REGIONAL PATENTS Designated State(s) GH GM KE LS MW SD SZ UG ZW AM AZ BY KG KZ MD RU TJ TM AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG"
Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="1999-03-18"
Legal Event Code 1="AL"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-27"
Kind Code of Ref Document="A1"
Designated State(s)="GH GM KE LS MW SD SZ UG ZW AM AZ BY KG KZ MD RU TJ TM AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG"
Legal Status: CODE="121" DESC="EP: THE EPO HAS BEEN INFORMED BY WIPO THAT EP WAS DESIGNATED IN THIS APPLICATION" INFL="" DATE_MIGR="0001-01-01"
"WO9818370W 1999-06-09121 EP: THE EPO HAS BEEN INFORMED BY WIPO THAT EP WAS DESIGNATED IN THIS APPLICATION"

Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="1999-06-09"
Legal Event Code 1="121"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-18"
Legal Status: CODE="DFPE" DESC="REQUEST FOR PRELIMINARY EXAMINATION FILED PRIOR TO EXPIRATION OF 19TH MONTH FROM PRIORITY DATE (PCT APPLICATION FILED BEFORE 20040101)" INFL="" DATE_MIGR="0001-01-01"
"WO9818370W 1999-07-01DFPE REQUEST FOR PRELIMINARY EXAMINATION FILED PRIOR TO EXPIRATION OF 19TH MONTH FROM PRIORITY DATE (PCT APPLICATION FILED BEFORE 20040101)"
Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="1999-07-01"
Legal Event Code 1="DFPE"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-18"
Legal Status: CODE="NENP" DESC="NON-ENTRY INTO THE NATIONAL PHASE IN:" INFL="" DATE_MIGR="0001-01-01"
"WO9818370W 2000-03-09NENP NON-ENTRY INTO THE NATIONAL PHASE IN: Ref Country Code KR"
Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="2000-03-09"
Legal Event Code 1="NENP"
DATE last exchanged="2003-01-01"
DATE first created="2003-05-26"
Ref Country Code="KR"
Legal Status: CODE="REG" DESC="REFERENCE TO NATIONAL CODE" INFL="" DATE_MIGR="0001-01-01"
"WO9818370W 2000-07-13REG REFERENCE TO NATIONAL CODE Ref Country Code DE"
"WO9818370W 2000-07-13REG REFERENCE TO NATIONAL CODE Ref Legal Event Code 8642"
Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="2000-07-13"
Legal Event Code 1="REG"
DATE last exchanged="2003-01-01"
DATE first created="2003-05-26"
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Legal Status: CODE="122" DESC="EP: PCT APP. NOT ENT. EUROP. PHASE" INFL="-" DATE_MIGR="0001-01-01"
"WO9818370W 2001-03-07122 -EP: PCT APP. NOT ENT. EUROP. PHASE"
Country Code="WO"
Filing / Published Document="F"

Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="2001-03-07"
Legal Event Code 1="122"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-18"
Legal Status: CODE="NENP" DESC="NON-ENTRY INTO THE NATIONAL PHASE IN:" INFL="" DATE_MIGR="0001-01-01"
"WO9818370W 2001-03-09NENP NON-ENTRY INTO THE NATIONAL PHASE IN: Ref Country Code CA"
Country Code="WO"
Filing / Published Document="F"
Document Number="9818370"
Kind Code="W"
IPR Type="PI"
PRS DOCUMENT TYPE="P"
Gazette DATE="2001-03-09"
Legal Event Code 1="NENP"
DATE last exchanged="2003-01-01"
DATE first created="2003-01-31"
Ref Country Code="CA"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="1999-03-18" PN="WO9913190" (B111EP)
Filed DATE="1998-09-04" PN="WO1998US18370" (B211EP)
DATE="1997-09-09" PN="US19970926146" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D11/10; G06F3/02"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
TI="HINGED DETENT"
="Two pivoting portions (430, 440) of a product are connected by a hinged detent. The hinged detent provides a snap feel when the product halves are closed or opened to an operable angle. It also allows for the placement of wires and connectors within the hinge. The hinged detent design further enables easy vertical axis assembly and provides for one of a multiple of operable angles to be factory-set. In adjustable hinge detents, a dial (520) or similar mechanism can be rotated to adjust and set the desired operable angle to which the hinged product halves will be opened. Locating elements (540) are forcibly disengaged from one set of adjusting recesses (610) in the adjustable hinge, then rotated to different adjusting recesses (610) of the hinge, and finally permitted to reengage the adjustable hinge in the new adjusting recesses." (B570EP)
="This mechanism permits a multitude of operable angles to be selected. Each time the product portions are reopened, they will automatically open to the previously selected angle. The adjustable hinge detent can be used, for example, to connect two v-keyboard halves, a screen to a laptop base, two components of collapsing headphones, or two parts of an adjustable stand." (B570EP)
Applicant="ERICSSON GE MOBILE INC (US)" (B711EP)
Inventor="PATTERSON GREGORY S" (B721EP)
Inventor="SNYDER THOMAS D" (B721EP)

#OPS Legal Status:
Family Member: PN="CN1113147C" PD="2003-07-02" AP="CN98810973A" PN_E="CN1113147C"
Priority: PRIO="US92614697A" DATE="1997-09-09"
Published DATE="2003-07-02" PN="CN1113147C" (B111EP)
Filed DATE="1998-09-04" PN="CN19980810973" (B211EP)
DATE="1997-09-09" PN="US19970926146" (B311EP)
EPC="E05D11/10D; E05D11/10E3; G06F3/02A"
IPC="E05D11/10; G06F3/02"
CI="E05D11/00; G06F3/02"
AI="E05D11/10; G06F3/02"
TI="Electronic device and method for regulating hinged positioning"

Applicant="ERICSSON INC (US)" (B711EP)
Inventor="PATTERSON G S (US)" (B721EP)
Inventor="SNYDER T D (US)" (B721EP)